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ABSTRACT

Articles in these proceedings of a conference of the Council for Programs in Technical and Scientific Communication represent the views of professional communicators and academicians who share a concern for providing breadth and quality of preparation for present and future technical communicators. The topics of the 19 papers include the following: (1) the present state and the history of technical writing instruction, (2) a graduate studies proposal for the University of Washington, (3) the master of arts in professional writing at Carnegie-Mellon University, (4) a master's in English with a special option in technical writing at Oklahoma State University, (5) the role of linguistics and language study in the technical writing program at Oklahoma State University, (6) developing a master of science degree in communications at Eastern Washington University, (7) technical communication as a humanities degree, (8) preparing writers for the world of work, (9) the certificate program at San Diego State University, (10) implications of research and experience for a technical writing program, (11) teaching the writing process in a laboratory setting, (12) a cooperative internship/degree program at Rochester Institute of Technology, (13) teaching technical writing on television at Northeastern University, (14) the efficacy of the required three hour technical writing course, (15) a course in technical and scientific literature, and (16) a graduate seminar in the theory and practice of technical writing. Minutes from the Council's annual business meeting, the conference program, and a list of Council members are included. (HTH)

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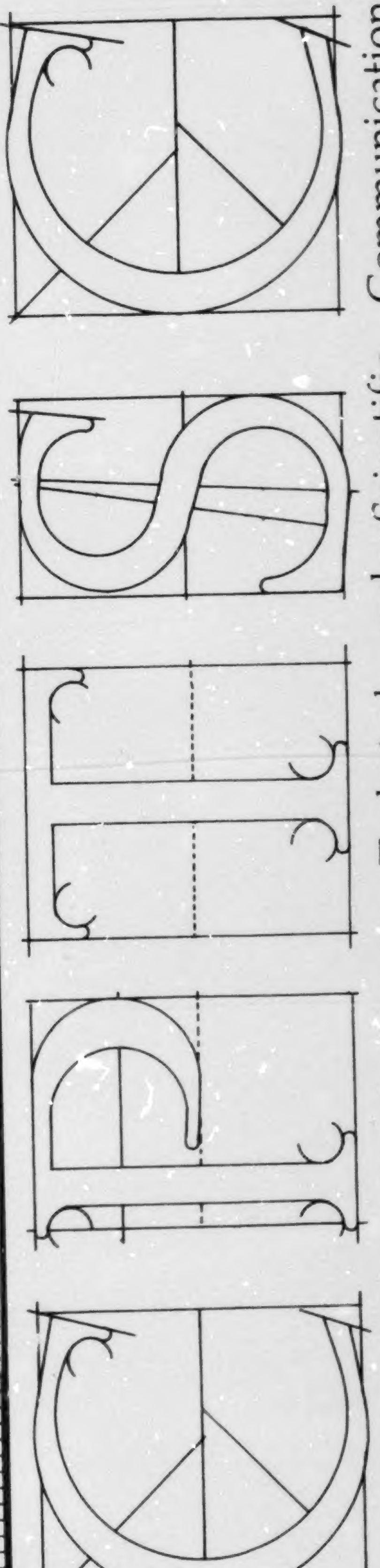
Proceedings

1984

Santa Fe,
New Mexico



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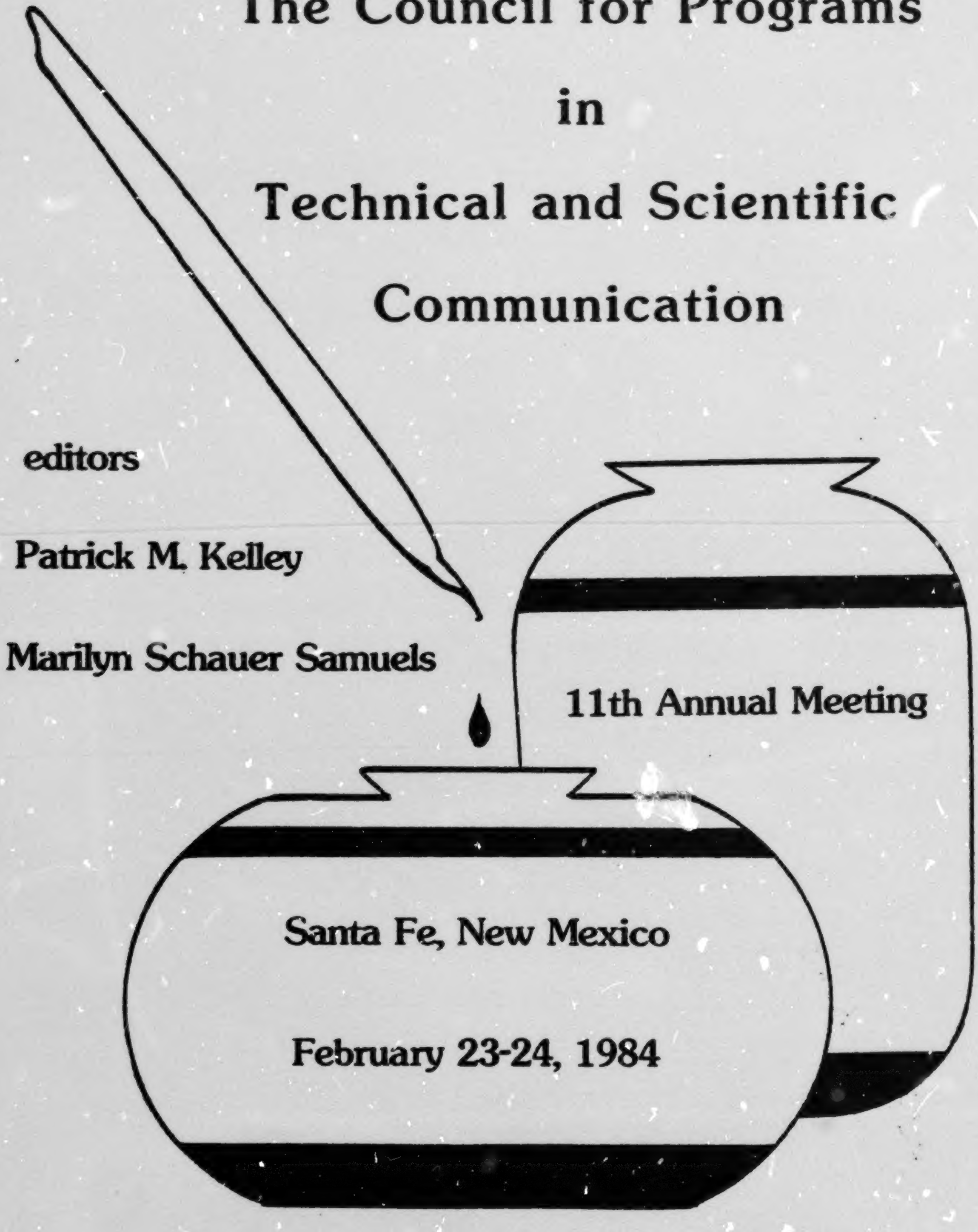
The Council for Programs in Technical and Scientific Communication



editors

Patrick M. Kelley

Marilyn Schauer Samuels

11th Annual Meeting

Santa Fe, New Mexico

February 23-24, 1984

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PREFACE

Included in Proceedings 1984 of the Council for Programs in Technical and Scientific Communication are messages from the President on the Council at present and the Vice President on the Council in the near future; the program for the Eleventh Annual Meeting of the Council at La Fonda in Santa Fe, New Mexico, on February 23-24, 1984; two keynote papers from past presidents of the Council; seventeen other papers from the program; a record of the annual business meeting with a list of the participants, the Secretary's minutes for 1984, and the Treasurer's report for 1983-84; and, as appendices, the Constitution of the Council, a list of the annual meetings of the Council with the sites and the dates, a chart that literally puts the Council on the map, and a directory of the current members of the Council.

Let me highlight for you a few facts about this meeting of the Council and these proceedings. These facts might be of interest to you whether or not you were able to participate in the meeting.

A total of fifty members participated in the meeting, a record number. This increase in the number of participants is to be expected. It corresponds to the increase in the membership and to the increase in the number of programs in the nation--the programs that the membership represents. The fifty participants at the meeting represented established programs, new programs, and potential programs. They represented graduate programs, undergraduate programs, certificate programs, service programs, and even an in-house program.

This meeting was the first meeting of the Council in the Southwest. To an extent, the meeting was a Southwestern meeting. Of the fifty participants, twenty-two were from the Southwest. Nine were from New Mexico itself. Another five were from Texas.

To an extent, the meeting was a Western meeting. Ten participants were from the West Coast with five from California and five from Washington. And a total of thirty-six participants were from west of the Mississippi River.

But fourteen of the participants were from east of the Mississippi, including participants from both the East and the South. The meeting, in fact, was a national meeting. The participants spanned the nation from Helen M. Loeb at Northeastern University in Boston to Sherry Burgus Little at San Diego State University in San Diego and from James W. Souther at the University of Washington in Seattle to Gloria W. Jaffe at the University of Central Florida in Orlando.

The theme of the meeting at La Fonda, the Inn at the end of the Santa Fe Trail, was "Blazing New Trails: Establishing Practical Applications of Philosophy and Theory for Programs in Technical and Scientific Communication." In these proceedings, I commend to you the two keynote papers on philosophy for programs by the first and second presidents of the Council, Thomas E. Pearsall of the University of Minnesota and Thomas L. Warren of Oklahoma State University. The seventeen other papers by leaders of programs include papers on established programs, new programs, and potential programs and on graduate programs, undergraduate programs, certificate programs, service programs, and an in-house program, plus papers on courses and components within programs. Often, the papers respond to the theme: "Establishing Practical Applications of Philosophy and Theory."

Please note a final fact. All of the papers in these proceedings were reproduced from originals that were provided by the authors, who were advised emphatically that their originals would be regarded as camera-ready copy.

As the host for this meeting of the Council, I thank the four faithful friends who assisted me with all facets of the meeting: Louise Merck Vest, Mary Sigurdson Hageman, Barbara Y. Myers, and Roger E. Masse. It was Louise who knew intuitively that La Fonda was the perfect setting for the meeting. It was all four of my faithful friends who made the meeting almost perfect for me. To thank Louise, Mary, Barbara, and Roger appropriately, I dedicate these proceedings to them.

Patrick M. Kelley

Patrick M. Kelley

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FROM THE PRESIDENT: CPTSC AT PRESENT

In 1984, as CPTSC begins its second decade, let me assess its success at achieving its purposes. According to the constitution, the Council has five purposes:

1. to promote programs in technical and scientific communication;
2. to promote research in technical and scientific communication;
3. to develop opportunities for the exchange of ideas and information concerning programs, research, and career opportunities in technical and scientific communication;
4. to assist in the development of new programs in technical and scientific communication;
5. to promote the exchange of information between the organization and interested parties.

Purpose 1

The first purpose of the Council--to promote programs in technical and scientific communication--has been the primary purpose of the organization during the past ten years. Readers whose memories of the profession extend from 1984 back to 1974 will appreciate the success with which the Council has achieved its purpose of promoting programs. In 1974, Thomas E. Pearsall, the founder of the Council and its first president, was able to invite leaders of programs from only twenty institutions to the first meeting of the Council. In 1984, in contrast, leaders of programs at about seventy institutions are members of the Council. These institutions are located in every region of the nation. The programs include service programs, certificate programs, two-year programs that lead to associate's degrees, four-year programs that lead to bachelor's degrees, and graduate programs that lead to master's degrees.

Purpose 2

The second purpose--to promote research in technical and scientific communication--has not been achieved with the same degree of success as the first purpose. During the past ten years, the energies of the Council as a whole and of most of its members as individuals have been directed more toward creating and developing programs than toward promoting research on which to base the programs.

The members of the Council are pioneers. As practical pioneers, they have directed their energies toward building programs.

This is not to say, however, that the members of the Council have built programs without philosophical and theoretical bases. Their programs always demonstrate implicitly the bases on which they have been built. These bases, though, rarely have been explicit.

Now that so many programs are built, members of the Council are re-directing their energies toward providing explicit philosophical and theoretical bases for their programs. The theme, in fact, for the annual meeting of the Council in 1984 was "Blazing New Trails: Establishing Practical Applications of Philosophy and Theory for Programs in Technical and Scientific Communication." And in these proceedings from that meeting, some of the bases are explicit.

Purpose 3

The third purpose--to develop opportunities for the exchange of ideas and information concerning programs, research, and career opportunities in technical and scientific communication--has been achieved with success through the annual meetings of the Council, the proceedings, and the directories.

Annual Meetings

The Council has met every year since 1974. It has met at institutions in every region of the nation.

Like the Council itself, the annual meetings are small. Typically, they include two dozen participants. And typically, these participants include a mix of leaders of established programs, leaders of new programs, potential leaders of potential programs, and professionals from the world of work. This perfect mix of participants within the small group achieves the purpose of developing opportunities for the exchange of ideas and information.

Proceedings

To achieve the same purpose on a larger scale, the Council also publishes proceedings of the annual meetings. Proceedings are available, in fact, for ten of the eleven meetings. These proceedings are compendiums of ideas and information on creating and developing programs in technical and scientific communication. No other resource is more valuable for these purposes.

Unfortunately, many of these proceedings have been as inaccessible as collectors' items. They always have been published in limited numbers. For the most part, they have been available only to members of the Council. A project at present, however, is to place all of the proceedings on microform in the Educational Resources Information Center (ERIC), where they will be accessible to all.

Directories

In 1979, Thomas L. Warren, the second president of the Council, edited a compilation of programs in technical and scientific communication:

Directory of Colleges and Universities [with] Degrees in Technical and Scientific Communication. This directory from the Council complemented the directory from the Society for Technical Communication (STC), Academic Programs in Technical Communication, the first edition of which was edited by Thomas E. Pearsall and Frances J. Sullivan in 1976 with the second edition edited by Pearsall, Sullivan, and Earl E. McDowell in 1981. During 1984, representatives of both the Council and STC--including Patrick M. Kelley, Roger E. Masse, Thomas E. Pearsall, and Frances J. Sullivan--joined to edit the third edition of Academic Programs in Technical Communication. Packed with details on programs in technical and scientific communication, this new directory will be published during 1985.

Purpose 4

The fourth purpose--to assist in the development of new programs in technical and scientific communication--has been achieved through the directories, the proceedings, and the annual meetings, as well as through personal correspondence and consultation. These are the tangible means to the end of assisting new members of the Council in the development of new programs. At least as important is an intangible: the remarkable professional and personal generosity of the senior members of the Council, the pioneers of programs, who share without recompense their experience and expertise with new members.

Purpose 5

Finally, the fifth purpose of the Council--to promote the exchange of information between the organization and interested parties--has been achieved with success. The Council maintains liaison with STC, and it sponsors a session frequently at the International Technical Communication Conference (ITCC). Members of the Council present reports on a regular basis at the meetings of other related organizations, including the Association of Teachers of Technical Writing (ATTW), the Conference on College Composition and Communication (CCCC), and the National Council of Teachers of English (NCTE). And members of the Council respond personally to a significant number of inquiries about programs in technical and scientific communication from interested institutions and individuals.

Conclusion

Beyond the five purposes of the Council is another purpose, a purpose that is increasingly apparent now that programs in technical and scientific communication exist in quantity. This purpose is the promotion of *quality* in our programs.

In one of the keynote papers at the annual meeting of the Council in 1984 and in a keynote paper in these proceedings, the first president of the Council, Thomas E. Pearsall, urges members "to build quality programs." And as the current president of the Council, I urge members to build quality programs. *Quality* will be the watchword of the Council at present--and probably into the future.

Patrick M. Kelley

Patrick M. Kelley
President

FROM THE VICE PRESIDENT: A LOOK AT THE NEAR FUTURE

People who predict or suggest the future are usually expected to wax fantastic--or, hopefully, prophetic. They are expected to look far ahead--to 2084, for instance--or to talk about the revealing book they are planning--tentatively titled Computer Farm. Instead, I'd like to consider the more foreseeable future--or what I hope you will come to see as the imminent present.

What I see close at hand for our organization, CPTSC, and the Society for Technical Communication (STC) is a series of cooperative efforts--efforts which are all but inevitable given the many ways in which the paths of the academic organization and of the professional organization already intersect.

The interfaces I foresee are in three categories:

1. job placement,
2. job training,
3. research and information about the technical writing profession and about how and where technical writing is taught.

1. Job Placement

This section might also be titled "The Technical Writing Teacher as Headhunter." As technical writing professors, we are frequently called on to recommend technical writers for positions in industry. This not only helps us both in placing our own students and in establishing reciprocal relationships with the business community, but also puts us in a position to assist more experienced technical writers, many of them members of STC, to secure employment. This year alone, in cooperation with the local Cleveland/Akron Chapter of STC, I was requested to act as liaison in three job placements. One company even hired me as a consultant, requesting that I participate in their interviewing process and determine if the candidates really knew anything about communication.

Just as technical writing teachers are often asked to evaluate technical writers, so technical writers and their managers are frequently asked to evaluate university technical writing programs--courses and faculty. Because we evaluate and sometimes provide or enhance each others' jobs, members of CPTSC and STC should cooperate more formally in the future in setting mutually agreeable standards for the teaching and practicing of technical writing.

We instructors should have some input into how technical writers are evaluated and in whether or not and how they might be certified; and professional technical writers, editors, and their managers should help determine accreditation guidelines for technical writing programs.

2. Job Training

Again, through mutual cooperation we can determine

a. the nature of the market for technical writers

b. the kind of training necessary to prepare writers for that market.

By having professional technical writers and their supervisors participate in the planning of university curricula, and by encouraging university teachers to take part-time jobs as technical writers during the summer or teach technical writing in industry, we can assure that

a. new technical writers will be taught what they need to know

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b. seasoned technical writers can receive the supplementary training they may need to keep up with and advance in their profession.

3. Research and Information

Members of CPTSC and STC are both seekers and sources of information. As such, we either receive or send out questionnaires which often duplicate each other. But what if it were no longer necessary to re-invent the wheel?

What if CPTSC and STC were to collaborate in the collecting, analyzing, and distributing of data relevant to all technical writing programs, all companies that hire technical writers, and all technical writers themselves? For example, after hearing a version of this paper at ITCC this spring, members of the two organizations decided to pool their resources for a joint directory of Academic Programs in Technical Communication.

Conclusion

Interaction between pre-professional schools and the professions for which they are preparing their students is a tradition. Medical schools cooperate with teaching hospitals; law schools cooperate with courts, judges, and legal aid societies.

In the future--the very near future--it would be appropriate for technical writing programs and the technical writing profession to follow in that tradition.

Let's cooperate! After all, both STC and CPTSC already share a common goal: maintaining and promoting excellence in the field of Technical Communication. Since CPTSC and STC share this goal, it would be appropriate for the academic organization and the professional organization to share in a series of cooperative efforts--as I foresee--along the intersecting paths toward their common goal.

Marilyn Schauer Samuels

Marilyn Schauer Samuels
Vice President

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PROGRAM

Eleventh Annual Meeting
of
The Council for Programs in Technical and Scientific Communication

La Fonda
"The Inn at the End of the Santa Fe Trail"
Santa Fe, New Mexico
February 23-24, 1984

"Blazing New Trails:
Establishing Practical Applications of Philosophy and Theory
for Programs in Technical and Scientific Communication"

(Wednesday, February 22)

A day to hit the Santa Fe Trail

with a champagne reception

and registration

awaiting

at the end

of the trail

8:00-10:30 Champagne Reception and Registration in Suites 256-260

Thursday, February 23

A laid-back day devoted to keynote presentations on philosophy for programs and short presentations on established programs with lots of time reserved for discussion--the kind of day that makes the meetings of CPTSC favorite meetings

Breakfast on Own in La Fonda

9:15-9:45 Host's and President's Welcomes in Santa Fe Room

9:45-10:00 Coffee

10:00-11:30 Keynote #1 by 1st President of CPTSC
Thomas E. Pearsall, University of Minnesota,
on philosophy for programs:
"Faith Without Works Is Dead"

Beekman W. Cottrell, Carnegie-Mellon University,
on established program

11:30-1:30 Lunch on Own (See Santa Fe)

1:30-3:00 Keynote #2 by 2nd President of CPTSC
Thomas L. Warren, Oklahoma State University,
on philosophy for programs:
"'History Is Philosophy from Examples':
Technical Writing Yesterday and Today"

Elizabeth Tebeaux, Texas A&M University,
on established program

Richard Watson and John Yules, Chapman College,
on philosophy for programs

3:00-3:30 Refreshments

3:30-5:00 Keynote #3 by 3rd President of CPTSC
David L. Carson, Rensselaer Polytechnic Institute,
on philosophy for programs:
"Writing Is All of a Piece"

Marilyn Schauer Samuels, Case Western Reserve University,
on philosophy for programs

7:00-8:00 Cash Bar in Santa Fe Room

8:00-9:30 New Mexican Buffet (with an option for gringos/gringas)
in Santa Fe Room

(Bring checkbook to pay for buffet, please)

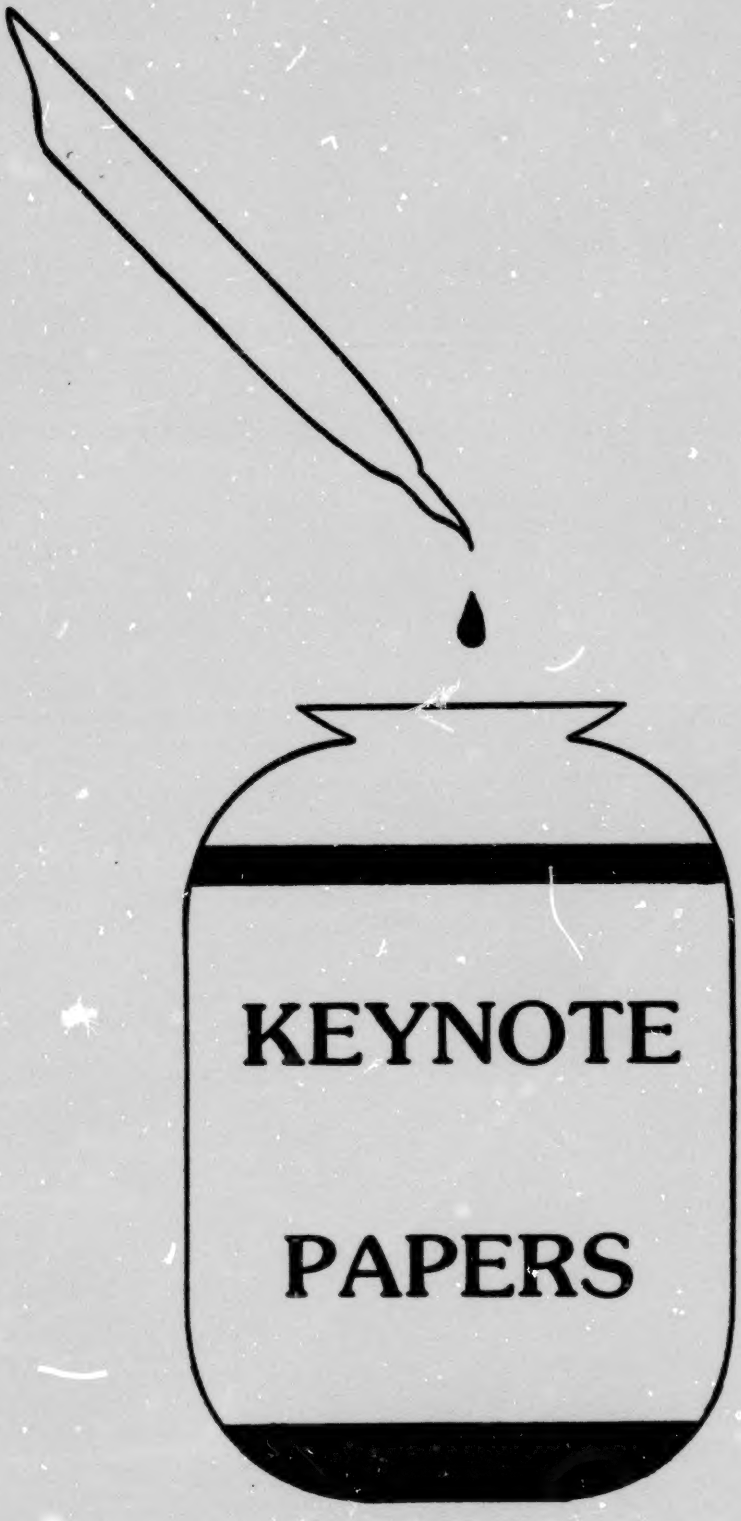
9:30- Entertainment in La Fiesta Lounge

Friday, February 24

A fast-paced day beginning with a brief business meeting, continuing with short presentations on new programs, and concluding with short presentations on theory for courses and on courses and components within programs

9:15-10:15	Business Meeting with courtesy Continental Breakfast
10:30-11:30	James W. Souther, University of Washington, James R. Corey and Scott P. Sanders, New Mexico Tech, Robert E. Ryan, Clark College, Sherry Burgus Little, San Diego State University, on new programs
11:30-1:30	Lunch on Own (See Santa Fe)
1:30-2:30	Irene D. Hays, Battelle, Pacific Northwest Laboratories, Sherry G. Southard and Bruce Southard, Oklahoma State U., Judith Kaufman, Eastern Washington University, Daniel Mast, Eastern New Mexico University, on new programs
2:30-2:45	Refreshments
2:45-3:45	Laura Rhodes Casari, University of Nebraska, on theory for courses Sam C. Geonetta, University of Missouri-Rolla, Jack Selzer, Pennsylvania State University, on courses within programs
3:45-4:00	Refreshments
4:00-5:00	Helen M. Loeb, Northeastern University, on unusual course Joseph C. Mancuso, North Texas State University, on course within program Carol Lipson, Syracuse University, on new courses within program Andrea C. Walter, Rochester Institute of Technology, on STC-sponsored internships

See Santa Fe--or Hasta la Vista



KEYNOTE PAPERS

FAITH WITHOUT WORKS IS DEAD

THOMAS E. PEARSALL
PROFESSOR AND HEAD
DEPARTMENT OF RHETORIC
UNIVERSITY OF MINNESOTA

This meeting begins our second decade. In the past ten years we have met at Minnesota, Boston, Colorado State, Minnesota, Rensselaer Polytechnic Institute, Oklahoma State, Central Florida, Washington, Carnegie-Mellon, and Nebraska. Today we meet in lovely Santa Fe under the auspices of New Mexico State University. These have been eventful years that I have been proud to share.

Last year you asked me to serve as archivist for CPTSC. I was happy to accept, and the acceptance caused me to pull our past proceedings off the shelf and to read them, somewhat idly at first. However, like a true technical writing teacher, I didn't read very long before the desire to categorize overcame me. The results of that categorization may interest you. Presenters at CPTSC meeetings have given 91 talks in the following categories:

Descriptions of proposed or existing programs	49
Internship programs	8
Communication theory	6
Community college programs	5
Non-written technical communication	5
Society for Technical Communication	4

Research	3
Impact of the computer	3
Miscellaneous (none more than one)	8

e.g.,graduate student problems
TW around the world
fundraising

Our strengths and weaknesses are both evident in these categories. We have been weak, for example, in research but strong in describing what it is that we have been doing. Such a tendency is understandable. As our programs have grown, with the attendant problems that such growth brings, we have been most interested in the practical solutions to our problems.

We have talked a good deal about what should go into a technical communication program. We have raised and attempted to answer such questions as these:

Should the program be interdisciplinary?
How to work with the horses in the stable?
What kind of science and math to include?
How much computer science?

In 1979, Bill Coggin gave us some insights based upon an STC survey:

> Programs should contain both communication and non-communication stems--the latter, as you might expect mainly but

not completely technical

Non-communication stem should contain

- Engineering
- Mathematics
- Business
- Physical and natural science
- Humanities

Communication stem should include

- Editing
- Communication research methodology
- Technical drawing
- Business communications
- Printing, bindery, platemaking, distribution

In 1981 Tom Warren reported the reactions of TW publications managers to a program at Oklahoma State: The managers' responses make interesting reading. Although the managers desired practice in writing and editing and in non-writing communication skills such as graphics and interpersonal communication, they were certainly not opposed to the basically liberal arts approach Tom was taking. Some even asked where the philosophy and logic were.

We show great ingenuity in making much from little.

In 1980, Patrick Kelley described the beginnings of a master's program at New Mexico State starting from a program with only one TW course in it.

The solution was to make the one course a workshop, repeatable for 12 semester hours. In the workshop, the students could practice the writing and editing process over and over and experiment with various TW products.

To this workshop was hooked a minor in computer science, to furnish the technical component, and enough electives to allow the students to broaden themselves in other communication and technical areas.

I compliment Patrick and his colleagues on what is a good program, but would insert a warning that we run dangers in this direction.

Obviously, a clear need exists for programs in such fields as business and technical communication. Latest estimates are that 55 per cent of the United States work force engage in the creating, processing, and distribution of information. This figure is up from 17 per cent in 1950. Some 30,000 people in the United States are technical writers. Many thousands more work in such information fields as public relations. But, in the rush to fill the need we should not overlook the requirements of quality. We should not be tempted to try what we are perhaps not really qualified to do.

Recently I was asked to evaluate a new program in our field. It was a disheartening experience. The people behind the program were good people with great potential. But they had come to communication, primarily from literature, only lately--as their students in literature had drifted away. Except for some consulting, they had little experience in the field. None belonged to organizations such as STC or the American Business Communication Association. Most did not even belong to NCTE or the 4 C's, the two organizations to which most English teachers interested in composition and communication gravitate. None had published in the field. None seemed to have a clear idea of what a career in business or technical communication really entailed. In addition their library holdings were inadequate in communication, and their administration had no notion of what was involved. The administrators seemed to think that attendance at a few professional meetings might provide the knowledge needed for a successful program.

I have no wish to belabor this point or my colleagues further. None of us is totally without sin in reaching for goals that we are not yet prepared for. And such reaching is not altogether bad. If we all waited for everything to be perfect before we began, nothing would ever get done. But, we must seek to build quality programs worth our students' tuition. The best degree programs, it seems to me, have grown out of the research, teaching, and community service of the teachers involved. New programs should attempt to build from a similar firm base.

One of the more thoughful talks on planning a master's degree program was given by Paul Anderson in 1981. In his talk, Paul described very well his planning process and the plan produced. I particularly liked Paul's solution to handling the problem of how a master's student should acquire needed technology and science (by the way, not all programs even recognize this as a problem).

As Paul pointed out, the problem could be solved by accepting only students with a good technical undergraduate preparation. However, Paul's solution is to make technical competency a requirement for graduation, not admission. Students who enter the program with inadequate technical skills have to gain these skills by taking needed undergraduate course in addition to the courses required in the master's program. In this way the graduates gain needed technology without the graduate program being diluted.

In addition to ideas about programs, the proceedings contain ideas on individual courses and on teaching.

In 1981, Victoria Winkler described our course at the University of Minnesota called "Writing for Special Purposes." The course is actually a series of modular courses that do not run a full term and allow us to squeeze in short courses that deal with such specialized TW products as proposals, manuals, newsletters, brochures, and so forth. Included in the proceedings is a complete course plan for one module.

Do you want to be less product oriented and more process oriented? Go to the 1982 proceedings and read the quartet of presentations by Patrick Kelley, Louise Merck Vest, O.J. Allen, and Roger Masse, all of New Mexico State for creative, imaginative approaches that could delight you and your students.

And so it goes. Since 1974, there has been a great faith in what we are about. But there has been much work as well. The archives show that we have been most willing to share the results of that work, and that we have believed that the annual meetings of CPTSC have been an appropriate forum for that sharing. May the next ten years show such a fruitful combination of work and faith.

"HISTORY IS PHILOSOPHY FROM EXAMPLES": TECHNICAL WRITING YESTERDAY AND TODAY.

THOMAS L. WARREN
DIRECTOR, TECHNICAL WRITING PROGRAM
OKLAHOMA STATE UNIVERSITY

I welcome the opportunity to discuss the practical applications of philosophy for programs in technical and scientific communications. I am not certain that any meeting of CPTSC has ever considered the practical applications of philosophy, and I want to congratulate Patrick and his group for focusing on that topic. We frequently talk about the practicality of our programs, or the philosophy behind technical writing (disguised as theory), but rarely do we think of programs as having a philosophy because those who develop programs usually do not think of philosophy from the start. This meeting should prove a significant one in the annuals of CPTSC.

I would like to say something about the title I chose and then focus on the point the title makes.

The quote is from Dionysius of Halicarnassus who migrated to Rome in about 30 B.C. He was both a rhetor and an historian--specialities that teachers of technical writing often need. He came to Rome full of enthusiasm for all things Roman, but bringing with him a peculiar slant--his Greek heritage. He produced a history of Rome (to the First Punic Wars) in some 20 books--10 of which has survived. He presents a view of history that is moralistic, panegyric, and carefully researched.

Dionysius' Scripta Rhetorica contains the key elements that are important to us today:

(1) He rejects the Asianic rhetorical patterns (these were post-Demosthenic and contrived).

(2) He favors a return to the elegance of the Atticest model--the classical models that reflected a simplicity and elegance.

(3) He favored a prose style that was clear, appropriate, and, most important, reflective of the situation.

I do not claim him as an early technical writer, but he does contribute to the development of rhetoric and hence is a forerunner of what we teach. Nor am I making a special plea for the return to the models of the past as he does. Rather, his importance is his view of history as being philosophy from examples.

CPTSC is an organization of examples. The first meeting was called because of the common problems directors of technical writing programs faced. Tom listed these in the letter he sent to all potential participants, mentioning five areas:

(1) Parts of programs

(2) Balance between specialized and generalized training

(3) The amount of technical training. (How much of the training is to be technical?)

(4) Jobs

(5) A comparison of graduates from technical writing programs and working professionals

The talks at that historic meeting centered around jobs, internships, elements in programs--both undergraduate and graduate--and research. A quick look at the list of those who attend these meetings shows that the majority are looking for help and advice before facing deans and department heads. While other organizations undergo identity crises, CPTSC continues to provide help, counsel, and support for those who are faced with the problem of starting a new program. Likewise, it is a favorite meeting for those from established programs because the problems never seem to end and solutions appear.

Being told by a head or dean that this Fall you will have in place a program that trains technical writers is an especially frightening thing. I have been extremely lucky in my academic career in that both of the jobs that I have held in technical communication have focused on program development. I was hired by both the University of South Dakota--Springfield and Oklahoma State University to develop programs. And this I did with a great deal of help. Others have not been so lucky. I have received many letters over the past five years asking how to start programs. They come, mainly, from panic-stricken literature teachers who, through the quirks of departmental politics, have been given the assignment of developing the new "major." That CPTSC exists makes the replies much easier.

From these letters and CPTSC proceedings, I have identified four problems common to developing a technical writing program:

(1) Political relationships

(2) Program and course content

(3) Theory vs. application

(4) Promotion, raises, and tenure for faculty

First, there are various political relationships to consider. What will the attitudes of your colleagues be? At OSU, I face a hard-core group of full professors, who, while they do little to promote the Department, are violently opposed to technical writing. The problem is not so much how to handle them (that's relatively easy because the voting majority of the Department believes in technical writing and trusts my professional judgment), but rather how to live with them. After all, many of us are traditionally trained in literature, and these people represent that "height" of our professional development--if we follow the literary route.

Then, there is the dean. What do you do with a dean who does not really care about technical writing (because it is really more appropriate to the area vocational school than to the university)? OR, the dean who is somewhat enlightened (there actually are such persons) but who imposes the technical writing program on the English Department without giving that department much say?

Relations with other faculty members--especially in the engineering and science fields--are usually no problem. They have been into that "other world" (I won't call it the world of work because we work and so do our students--and I won't plug books in talks) and know that technical writers are very important people. In sum, how do you cope with those mired in the custom and traditions of academia?

A second problem that you notice when you scan the Proceedings of CPTSC is the definition of the product--the graduate. How do you train someone to become a technical communicator? What courses do you offer and what do you include? Many papers in the Proceedings describe courses, and the Council's directory lists specifics about what various schools offer. Essentially, there are three areas that directors (as I choose to call us) are concerned about: Courses in technical writing, general electives, and technical electives. We all work within the framework of our schools, and that framework provides that so many hours are needed for a degree, of which some are to be taken in this area and some in that area. You will hear at this meeting and read in the past Proceedings the details of what other schools offer. The important thing is to know what your school requires and then build on that--using the talks and materials as guides.

Likewise, how do you determine course content? The advice that emerges from discussions and the Proceedings is that you really have three sources (assuming that you do not have the industrial experience yourself): form advisory committees, take surveys, and join and attend CPTSC.

Advisory committees can be very helpful to you because they have had the experience on the job and know what kind of training your students need to be technical writers. They are most willing to help you--as I have constantly found out. The only problem that you have with advisory committees is to make sure that they are advisory and do not have authority over your program (after all, you have better insight into the policies and politics of your department and college). You will more than likely find these people through your local STC chapter or local industries (cultivate these contacts carefully because they do become good sources for internships).

Surveys are useful IF they do not retrace familiar ground. I imagine most directors of programs have done a survey of one kind or another, and I think that a good project for an intern would be to ask the directors what surveys they have done and what they found out. The results could be a part of the Proceedings next year.

Surveys and committees are fine, but the custom and tradition of academia, especially literature departments, is to distrust them. Program and course development are the perogative of the professor of literature. Again, how do you cope?

Still a third problem is the relationship between the theoretical content and the practical experience with a program and course. Students in literature receive a healthy dose of theory in the form of the literary-critical perspective of the teacher and the department. Taking professor X for 20th Century British Literature ensures that you will have 16 weeks of symbolistic interpretation of the major 20th Century British novels. But what does it mean to take Advanced Technical Writing from my colleague Sherry Southard? Also, what does it mean to take your undergraduate work in technical communication from RPI rather than Carnegie-Mellon and your graduate work at OSU? Departments/programs do have philosophies based on the interests of the staff. As an example, when I teach the editing course, I teach about 35% copy editing (theory) and 65% production editing (practical). Sherry reverses that percentage. My point is that there are multiple interests in technical communication (Paul Anderson and his colleagues certainly proved that with their new anthology of essays). What do you, the new director, do? How much theory is enough for your course and program and what kind? How much actual experience and what kind? We decide on a ratio and develop accordingly.

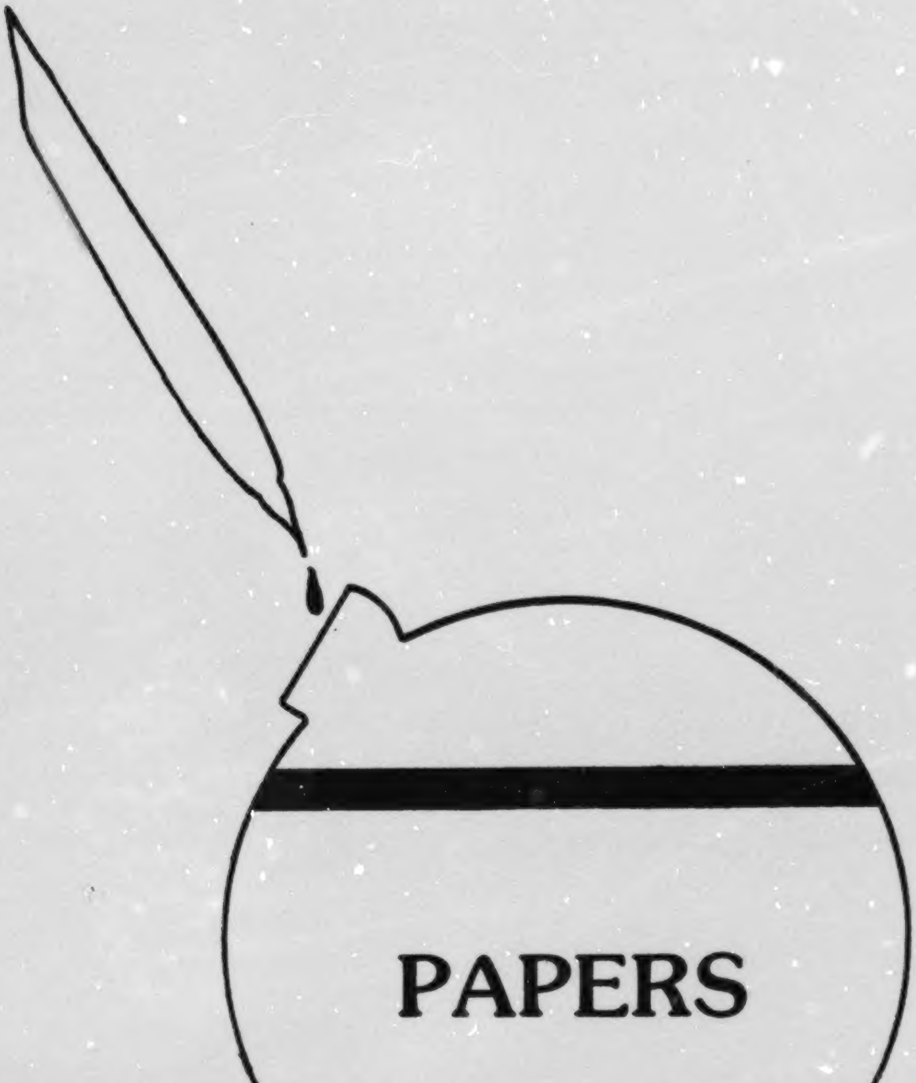
Internships also present special problems. Every study that I have seen suggests that we must have some form of internship for the student. Whether that internship is credit or pay or both is a matter that the individual director decides based on a concept of what the intership is to be and what the reactions of the department/college will be. Is the internship the learning experience the papers in past proceedings have built it up to be? Does it give the student a kind of rite of passage into the world, making that transition from college to industry? Answers to these questions come from your understanding of the department as well as what you believe to be the training of an educated technical writer. Again, formulating a policy suggests that philosophy has become concrete.

Once past these three problems of the students, the remaining problem that always receives a great deal of discussion at these meetings is the professionalism of the teacher. We, as directors of technical writing programs, are faced with the challenge of proving that we do indeed have a discipline. A frequent comment heard from the full professors around OSU is that technical writing was taught 30 years ago in journalism, so why now in English? What does it add to both the departmental curriculum and the honor/glory of the academic profession? I sometimes think that I have trampled the toes of motherhood, apple pie, and Ronald McDonald. We do have a distinguished professionalism built upon both an intellectual history and a working with primary materials.

The intellectual history is, unfortunately for our more narrow-minded literature colleagues, interdisciplinary. My own research interests cut across literary history (the development of a body of scientific and technical literature), cognitive psychology, semantics, linguistics, and management/organizational communications. Directors of technical writing programs are probably more humanistic and broadly-based in their research interests than are those who profess a speciality in Chaucer or Goldsmith. We must take the wider view because, to take one example from papers in previous Proceedings, communication theory transcends language, linguistics, psychology, and sociology and communication is our profession. When we present our work for evaluation by colleagues, we often find that we take second place to a study of the blood imagery in a Marlowe play because the evaluator may be more familar with such a paper than with one on the importance of signs and meaning in establishing reader-writer relationships in a technical manual. At that point the examples of other directors become important. Dwight Stevenson is at work on such a project.

In addition to the intellectual history interests of the directors, there are also the many possibilities for more practical experiences. But if you put these in your evaluation forms, the chances are that you will receive low marks. Let Professor Y go off to study the manuscripts of Nigel Dennis and you will find that the evaluators are heaping praise on the project. Let you go off to spend a summer as a lead technical editor or writer in a major supplier for the government, and you have a problem at evaluation time. Others have faced that problem, and through an argument that they are doing research at the spot/point of creation and are dealing with primary research materials, they have won appropriate raises/promotions/tenure. Again, the basis for what we do as directors of programs that produce technical writers is to combine the theoretical and the practical. Writing about the mythological dimensions of Dennis' Cards of Identity is no different than relating to students and colleagues the influence of Information Mapping on the development of a more readable technical manual. The problem is to make the evaluators see that.

The sum total of the history of this organization, from the idea Tom Pearsall had in 1974 to this present meeting is that its history is philosophy from examples. Aesop in "The Two Crabs" suggests that "Example is the best precept," and while the rhetor from Halicarnassus did not foresee technical writing, he did foresee the importance of models in the development of rhetoricians. The practicality of this organization's philosophy is clear on every page of the Proceedings and in every discussion at every meeting: The history of this organization is a collection of the experiences we all have had. These are the examples that lead to a philosophy and ultimately a history. These past ten years have made clear through the Proceedings that we do know who we are and where we are going. The sum total of those ten years is that the *tomorrow* I do not mention in my title emerges through the examples we generate for those who follow. Thomas Carlyle pointed out that philosophy is the battle agianst custom, and we in CPTSC know both the fight we make against custom and the power that example brings to that fight.



PAPERS

A GRADUATE STUDIES PROPOSAL

JAMES W. SOUTHER
DIRECTOR, SCIENTIFIC & TECHNICAL COMMUNICATIONS PROGRAM
UNIVERSITY OF WASHINGTON

We are in the process of designing what we consider to be an excellent graduate degree, actually a two-pathway master's degree. Since any graduate program is built on undergraduate preparation, it might be wise for me to briefly describe our undergraduate Scientific and Technical Communications Program and the various degree paths available to the student.

UNDERGRADUATE PROGRAM

Students may establish an STC undergraduate major through one of two interdisciplinary degree programs: One in the College of Engineering and a second in the College of Arts and Sciences. Both programs offer two degree options: Engineering a BSE (a professional engineering degree) and a BS (not a professional degree), and Arts and Sciences either a BA or a BS degree. The major difference is in the technical component of each degree.

BSE......4 yrs. of ENGR plus STC
BS.......3 yrs of ENGR plus STC
BS......30 credits of Science & Math plus STC
BA......20 credits of Science & Math plus STC

In each degree the technical communication component consists of the same set of required courses and variation is permitted in the communication electives.

Required STC Courses

STC 401 Scientific and Technical Writing (4)

Principles and practices of writing to communicate scientific and technical information to a variety of readers, including the expert, the general scientific and technical reader, the manager, and the general public. Prerequisite: junior standing or instructor's permission. Entry card required.

STC 402 Scientific and Technial Editing (4)

Editorial responsibilities and practice in the communication of scientific and technical information; the editor's role both as editor and as supervisor of publication groups. Prerequisite: STC 401 or instructor's permission.

STC 415 Production Editing (4)

The editorial role in the preparation of scientific and technical materials for production (typesetting, layout, printing, binding, distribution). The editor's responsibilities and prerogatives as they relate to those of other professionals in the production end of the publications field. Offered jointly with CMU 415. Prerequisite: STC 402 or instructor's permission. Entry card required.

STC 403 Publication Project Management (4)

Responsibilities and practice in managing publications projects in scientific and technical organizations. Project design, coordination, production, and evaluation; including planning, organizing, staffing, and directing. Prerequisite: STC 402 or instructor's permission.

STC 495 Professional Practice (3-5; max. 10)

Supervised internship in a working publications organization approved by the faculty advisor. A minimum of one internship is required of students taking an interdisciplinary degree in scientific and technical communication. Prerequisite: STC 401 and 402, or permission and faculty sponsor's approval. Offered on credit/no credit basis only.

STC 499 Special Projects

Recommended STC Electives

ENGR 332 Technical Briefings and Presentations (3)

Technical information for different audiences and different purposes. Includes analyzing the professional situations, preparing the presentation, and the role and use of visuals. For students in engineering and similar professions and for those in the natural, social, and health sciences. Concentrates on professional papers, management briefings, and public presentations.

STC 407 Computer Documentation (3)

Writing documentation for computer hardware, software, and integrated systems. Kinds of documents needed; the use of computer in its own documentation and resulting innovations. Entry card required.

STC 408 Special Documents: Proposals, EIS, Manuals (3)

Preparing proposals, environmental impact statements, and manuals for scientific, technical, and community projects: examination of established guidelines and preliminary steps; planning, organizing, writing, and submitting the documents, with emphasis on writing for the decision-making process. Prerequisite: upper division standing or instructor's permission.

STC 409 Writing for Publication

Writing for professional and trade periodicals in science, engineering, and technology; examination of the publication process, including the roles of author, editor, and reviewer; selecting the appropriate periodical; organizing and writing the article. Preprequisite: upper division standing or the instructor's permission.

As you can see, our undergraduate program produces technical communications professionals who find employment as writer/editor and publications staff members.

PROPOSED GRADUATE PROGRAM

What then should our graduate program emphasize? Our choice was to design a graduate program that would build on our undergraduate base and at the same time provide upward career mobility. Consequently, we choose to emphasize communication management. The future challenge, it seems to us, is in that understanding of the role and function of communication and information in organizations. This emphasis is seen in our curriculum design and in the content of the courses. Also we realize that our position in a College of Engineering provides a setting for a unique contribution. So we see ours as a small but quality program which includes more technical course work than found in other similar programs.

Again, we plan two pathways: one for students with an engineering undergraduate degree--MSE, and one for students from other undergraduate fields of study--MS. Both require course work in science and math, including calculus, and in technical writing, editing and production. The Tables following show the general structure for each of the two pathways.

STC GRADUATE DEGREE PROPOSAL
College of Engineering

MSE		MS	
STC COURSES Required	(20)	STC COURSES Required	(20)
STC 501 Theoretical Found of Tech. Comm.	(4)	STC 501 Theoretical Found. of Comm.	(4)
STC 505 Information Mgt. in Tech. Commun.	(4)	STC 505 Information Mgt. in Tech. Comm.	(4)
STC 510 Managing Commun. in Organizations	(4)	STC 510 Managing Commun. In Organizations	(4)
STC 515 Document Design	(4)	STC 515 Document Design	(4)
STC 520 Publications Mgmt.	(4)	STC 520 Publications Mgt.	(4)
		Electives Rhetoric, Comm. Theory, Computer, Data Mgt., Doc. Design, Systems, Sy Analy.	(8)
TECH. COURSES Engr. courses in student's field or interests	(21)	TECH. ELECTIVES Engr. or Sc. Courses: related to career objectives	(15)
STC 700 Master's Thesis	(9)	STC 700 Master's Thesis	(9)
or		or	
STC 550 Graduate Internship	(5)	STC 550 Graduate Internship	(5)
and		and	
STC 600 Commun. Project	(4)	STC 600 Commun. Project	(4)
EXAMINATION		EXAMINATION	
TOTAL CREDITS	(50)	TOTAL CREDITS	(52)

ADMISSION

Students admitted to the MSE Program must have
- A Bachelor's Degree in Engineering, including
  - 12 credits of technical writing, technical editing and production editing

Students admitted to the MS Program must have
- A Bachelor's Degree, including
  - 30 credits in basic science and mathematics, including calculus
  - 12 credits in technical writing, technical editing, and production editing

Equivalent experience may be substituted for these credit requirements if approved by program advisors, Students may be admitted into these programs without these credits. However, they must complete such courses before registering for thesis or internship, and these courses cannot be used to satisfy degree requirements.

Proposed STC Graduate Courses

STC 501 Theoretical Foundations of Technical Communication

An examination of theories and research drawn from a variety of fields that include such topics as the historical and social context of technical communication, the aims of technical discourse, readability, invention and audience, audience analysis, technical style and graphics.

STC 505 Computers & Information Management in Technical Publications

Studies the use of computers in technical publication. After introducing the concepts of information theory, the course goes on to place the issue of information management into the larger context of computerized publishing (both procedures and technologies internal to the publishing unit and electronic media for external dissemination of information).

STC 510 Managing Communications in Organizations

Managing information systems; decision support systems and external communications; categories of information and information delivery systems; theories of communications; and case study and evaluation.

STC 515 Document Design

Planning, preparing, and testing technical documents following the document Design Model; standard and innovative document formats; identifying and using empirically verified communication principles both in text and nontextual elements; the role of the Document Designer and Communication Analyst in technical organizations.

STC 520 Publication Management

Management functions in technical publications with emphasis on industrial or governmental publishing, periodical publishing, and consulting and contract services; planning, organizing, staffing, directing, controlling and evaluating such units..

Objectives of the Program

The objective of the proposed STC graduate program is to provide graduates who can (1) work with other professionals in determining organization informational requirements, (2) manage information systems, (3) design information delivery documentation and systems, and (4) manage scientific and technical publication programs in industry, government and education. Each of the two pathways is structured to allow its graduates to combine technical and communication studies in unique and diversified ways. The MSE allows the engineer to combine engineering and communication studies, and the MS provides a path for the non-engineer to combine communication studies with work in engineering. Both combinations have been traditional in the STC field, and the proposed pathways allow each group of graduates to prepare for advanced communication activity and increased management responsibilities.

We believe these pathways provide an exciting and unique approach to graduate technical communications careers. A growing, expanding, maturing field requires different approaches in educational programs. Our proposal is an attempt to define a different but valuable professional preparation.

FILLING A FELT NEED: THE MASTER OF ARTS IN PROFESSIONAL WRITING

BEEKMAN W. COTTRELL
PROFESSOR OF ENGLISH
CARNEGIE-MELLON UNIVERSITY

As many of you know, the then Carnegie Institute of Technology inaugurated, in 1958, one of the first undergraduate degrees in technical writing in the United States. Led by Erwin R. Steinberg, the English Department introduced a Bachelor of Science degree in Technical Writing and Editing. Its entry into the curriculum was not easy, due to opposition against such a "practical" degree in an English Department (read "literature") but the graduates then and now have found increasingly successful, fulfilling jobs and the reputation of the degree, both locally and nationally, has prospered.

The B.S. indicates an important fact about the degree. It is designed for those students who can handle both the literary and writing sides of the degree and the scientific and mathematical aspects as well. Clearly, this limits the clientele, but it lends—and has always lent—a special distinction to the degree.

The degree includes four major components: four advanced writing courses, including an internship in the spring of the senior year; four advanced courses in literature; exposure to at least one course in chemistry, physics and biology, building on two semesters of calculus; depth (two or three courses) in one of these scientific disciplines or in a closely related field such as engineering or statistics; and two courses in graphic design. The theory behind this wide spread of courses and disciplines is that exposure to a number of science, math and writing courses will best prepare the technical writing graduate for whatever jobs are available. Clearly, in recent years, computer courses have entered fully into this curriculum.

In the years following 1958, the English Department received many calls asking whether we offered a master's program in Technical Writing. The answer was always a reluctant no, because we in English felt we had no staff members qualified to teach a course in science writing and editing, or courses in the history of science. RPI and a very few other good schools have supplied this kind of degree.

More recently, the requests have become more frequent and insistent, and not always for a purely technical writing degree. And so the present Master of Arts in Professional Writing has emerged. Professional is not an ideal term, but it is the most workable one we have been able to find. It is meant to signal preparation for a career "as writers, editors, and documentation analysts in business and government." The degree holders "write regulations, brochures, forms, manuals for operating and repairing machines, public relations releases, in-house publications, and so on--in short, the kind of writing necessary for carrying on the day-to-day affairs of society." It is not journalism, it is not the technical world of industry. It is simply the vast, amorphous writing world in between, badly in need of skilled workers.

The MPW is a brand new degree, with a limited number of graduates so far. It consists of three semesters of course work in writing, rhetorical theory, linguistics, visual design and computer technology. It also requires a three-month summer internship in a government agency, consulting firm, corporation, university or other appropriate organization. The department guarantees to aupply such paying internships, though students themselves often seek and find the kind of internship they want.

The required curriculum includes three advanced writing courses, two rhetoric courses (History of Rhetoric, Contemporary Theories of Invention, etc.), one course in linguistics, one course in computer science, two courses in visual design, and two or three electives (from such areas as psychology, management science, statistics, or literary studies).

The MPW is open to part-time as well as full-time students. Most candidates begin the program in the Fall term and fulfill their internship in the following summer, thus receiving their degree at the end of the third regular semester. But the degree is new enough and flexible enough that each student can work out his or her way to fulfill the 36 (108 units) hours of classes and the 2 (6 units) hours of internship in a way consonant with each student's prior college experience.

This master's degree is a very personal one, designed with the help of a committed advisor to fill the needs and prospective job goals of each student in the program. Its distinctive features are the emphasis on computer and on graphic design, with the chance to work directly in the newly-established Carnegie-Mellon Document Design Center.

The degree can be—and usually is—a hands-on experience, formed to serve the needs of mature men and women, most of whom come to it with a conventional liberal arts degree and a desire for more practical training. The MPW is an evolving degree, so that specific requirements may shift slightly in response to future felt needs.

AN M.A. IN ENGLISH WITH A SPECIAL OPTION IN TECHNICAL WRITING: FROM THEORY TO PRACTICE AT OKLAHOMA STATE UNIVERSITY

SHERRY G. SOUTHARD
ASSISTANT PROFESSOR OF TECHNICAL WRITING
OKLAHOMA STATE UNIVERSITY

In the spring of 1984, the English Department at Oklahoma State University began offering a Technical Writing Option as a part of the existing M.A. in English.

This Option evolved from the following circumstances:

1. We had to follow the established procedures and policies for the M.A. in English offered by the Department.
2. We had certain constraints such as the Option could require no additional faculty, no new courses, and no additional resources from the Department.
3. We would be preparing many of our students to become managers of technical writing publications departments; therefore, a management course and a psychology course, in addition to technical writing/editing courses, would be useful.

In designing the Technical Writing Option, we had to use "the horses and saddles in the stables" to paraphrase Thomas Pearsall; that is, we had to use the existing framework of policies and procedures as well as make maximum use of the current faculty and courses in the English Department. Then, given those "horses and saddles," we wanted to develop a program that would be suitable primarily for those preparing to become managers of technical writing publications departments. However, we also wished to structure our program so that it could be adapted for those wanting to teach (persons who will earn Ph.D.'s in composition/rhetoric or literature elsewhere) and for those wanting to improve their competency in their chosen career in a "technical" area.

We accordingly define "technical" broadly; we give students the "techniques" for their area of speciality. For example, a student's area could be curriculum design (as a proposal writer in an education department), medical writing, German and technical writing, political science research, or development of user manuals for computer software that the student writes. In fact, we have students in each of those areas of speciality.

Within our guidelines, students in our Technical Writing Option can develop programs suitable for individuals (their "technical" areas, academic and work experiences, and career objectives). The Option allows students to draw upon the knowledge of faculty in many areas: from faculty within the English Department (technical writing, linguistics, rhetorical theory) and from those outside the Department (management, psychology, computer science, various technical areas).

The Established M.A. Program

Students at Oklahoma State University earning an M.A. in English in the traditional area of literature must pass a Critique of Style Examination (COSE) during their first year, meet a foreign language requirement before they take their M.A. examinations, complete 30 credit hours of course work, pass three 2-hour examinations, and write a thesis.

For the 2-hour COSE, students must define briefly 20 literary terms that the Examination Committee choses randomly from M.H. Abram's A Glossary of Literary Terms (4th ed.) and write a stylistic analysis of either a poem or a prose passage. Students take this examination about the twelfth week of their first semester. The Examination is a diagnostic one; however, those who do not pass the COSE must take it again the following semester, and if they do not pass the examination on their second attempt, they are dropped from the graduate program.

Students meet their language requirement by demonstrating a dictionary reading knowledge in one of several natural languages or by completing 6 credit hours in language and linguistics.

After completing their language requirement and their course work, students take three 2-hour examinations based on reading lists consisting of 45 works (primary and secondary sources). All students must be examined in American literature and British literature and in one of the following areas: literary theory, film, linguistics, and composition/rhetoric.

The Technical Writing Option

General

Thus, we began with a general framework. Students in the Technical Writing Option take a diagnostic examination at the beginning of their first semester. Unlike the COSE, though, the examination is purely diagnostic; no one passes or fails. The "Grading" Committee evaluates the work that students do on the examination and recommend any course work that students need. [The final decision about additional/supplemental coursework is made by the students and their advisors and committees, using the results of the diagnostic examination, academic and work experience, and career objectives.]

For the examination, students evaluate ("edit") a piece of technical writing and write a cover memo to the author. The "editing" part of the examination requires students to use their knowledge of grammar (language and linguistics) and their writing/editing skills. The "Grading" Committee uses the cover memo to evaluate the students' own writing skills and interpersonal skills.

Students in the Technical Writing Option can meet the language requirement using any of the choices available to those pursuing a degree in the traditional literature program, but they can also choose to take two courses in computer science. [See "The Role of Linguistics and Language Study in the Technical Writing Program at Oklahoma State University" by Bruce Southard in this volume.]

Most students in the traditional program complete 24 hours of course work and write a thesis. Students in the Technical Writing Option also have this choice; however, they can choose a non-thesis option in which they complete 33 hours of course work and develop a Creative Component; they do not write a thesis.

The Creative Component most often comes out of the 6-credit-hour Internship required of all students in the Technical Writing Option. This Creative Component includes a descriptive introduction of an appropriate length and a portfolio of the technical writing/editing that the student worked on during the Internship. The introduction written is not a part of the regular work in the Internship. The Creative Component can, in addition, be "a special report, an annotated bibliography, a project in research or design," as stated in the Oklahoma State University Graduate Catalog.

Our students take three 2-hour examinations based on reading lists consisting of 45 works, just as do those in the traditional program. All students must be examined in technical writing theory and in two of the following areas: language and linguistics, rhetoric and development of style in technical/scientific literature, one of the areas in the traditional program (such as American literature or British literature), or a special field (such as geology or computer science). Students who choose to complete their language requirement by taking courses in either language and linguistics or computer science cannot choose to be examined in those areas.

Those on the technical writing faculty prepare the examinations for technical writing theory and for rhetoric and development of style in technical/scientific literature. Students being tested in one of the areas in the traditional program take the same examinations as students in that program, and those being tested in a special field take examinations written by faculty in that particular field.

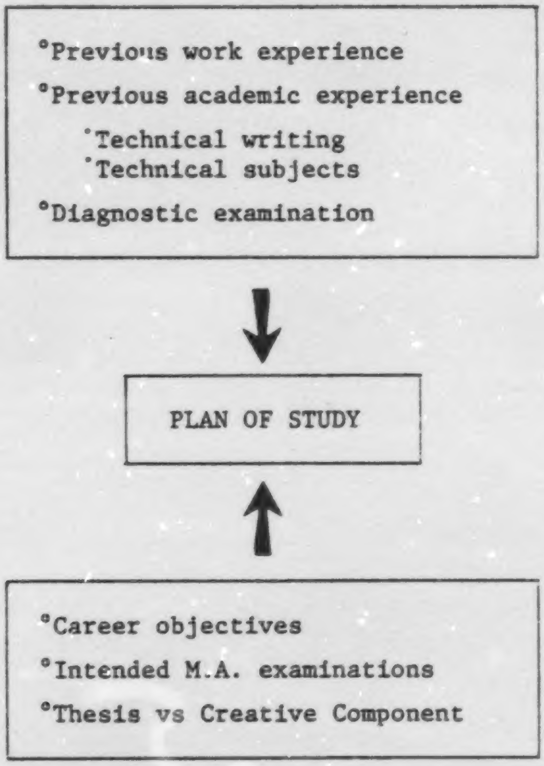
Course Work

During their first or second semester, students prepare a Plan of Study (a plan of the courses that they will take) to file with the Graduate College. This Plan of Study is based on the following outline of required courses and electives.

English 5013	3 cr's	Introduction to Graduate Study
English 5290	3 cr's	Writing For Publication
English 5210	6 cr's	Internship
Electives in English	6 cr's	[usually Advanced Technical Writing and Scientific/Technical Editing]
Psychology	3 cr's	[information processing, employee motivation, or management, leadership, and human relations]
Management	3 cr's	[management and organization theory or personnel management]
English 5000*	6 cr's	Thesis

*Instead of writing a thesis (6 cr's), students can take nine credit hours of course work and develop a Creative Component.

Students determine the specifics of their Plan of Study with their advisor by using the information indicated in the flowchart below.


°Previous work experience
°Previous academic experience
°Technical writing
°Technical subjects
°Diagnostic examination
PLAN OF STUDY
°Career objectives
°Intended M.A. examinations
°Thesis vs Creative Component

Sometimes students enter the Technical Writing Option without having much course work in technical subjects. These students must take courses that do not count as a part of the course work required for their degree. The courses chosen and how many courses they must take depend upon the job goals of those students.

Most of the students take Advanced Technical Writing and Scientific/Technical Editing, unless they have graduated from an undergraduate program in which they took similar courses. [Students who have not had any technical writing courses must take Intermediate Technical Report Writing, a prerequisite for all of the technical writing courses.]

Other English courses suitable for those in the Technical Writing Program include the courses listed below.

English 4550*	3 cr's	Research Problems: Technical Writing
English 4563*	3 cr's	Scientific/Technical Literature
English 5223	3 cr's	Teaching Technical & Business Writing
English 5213	3 cr's	Teaching Freshman Composition
English 5243	3 cr's	Teaching English as a Second Language
English 5210 and 6210	up to 9 cr's for each	

Independent Study courses such as the following ones:

- Intermediate Technical Report Writing [for those who have not had any technical writing courses -- a prerequisite for all of the technical writing courses]
- Readings in Technical Writing/Editing [for those who have work experience which included practical projects similar to those required in Advanced Technical Writing and Scientific/Technical Editing -- the theory presented in those courses]
- Various other courses structured by the student and teacher according to the needs and interests of the students and the expertise of the teacher]

Language and linguistic courses [See "The Role of Linguistics and Language Study in the Technical Writing Program at Oklahoma State University" by Bruce Southard in this volume.]

*Approved for graduate credit

It is too early to declare the program a success. However, as of June 1984, 17 persons are taking courses full time or part time in the Program. Six of them plan to complete an M.A. in English with a Special Option in Technical Writing by the end of the summer of 1985.

THE ROLE OF LINGUISTICS AND LANGUAGE STUDY IN THE TECHNICAL WRITING PROGRAM AT OKLAHOMA STATE UNIVERSITY

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OKLAHOMA STATE UNIVERSITY

Technical writers and editors are necessarily involved in the effective use of language. Surprisingly, however, limited research has been conducted into the relationship between the formal study of language [that is, "linguistics"] and technical writing. While technical writers and editors are expected to know the standards of written communication, little course work, especially at the graduate level, is devoted to the reasons for these standards or, more importantly, to the "why's" of effective communication. While considerable attention is devoted to the "how's" or writing and editing, few students gain insight into the complex phonological, morphological, syntactic, and semantic components that constitute a natural language and dictate "why" certain forms and constructions are more effective than others in conveying ideas from one person to another. By participating in the creation of the Technical Writing Option at Oklahoma State University, accordingly, I felt that I had an opportunity to provide students with a sufficient grounding in language study as to insure a basic knowledge of the workings of language, as well as to provide me with some basic research data that I could use to examine the relationship between linguistics and technical writing.

Because the graduate technical writing program at Oklahoma State originated as an option to the existing M.A. program in English, the

Technical Writing Option had to conform to the general regulations governing the M.A. degree. [See S. Southard's "An M.A. in English with a Special Option in Technical Writing: From Theory to Practice at Oklahoma State University" in this volume for additional details.] Accordingly, students were required to meet a foreign language requirement as well as to face written examinations in three areas. The foreign language requirement, however, already incorporated the study of language and linguistics. That is, literature students had the option of studying Old and Middle English or various aspects of linguistics in lieu of demonstrating a reading knowledge of a foreign language. While a reading knowledge of a foreign language might be important to a student interested in the influence of ancient literatures upon English literature, in modern literature, or in developments in literary criticism, I deemed it of less value to the prospective technical writer/editor. In my view, then, the "linguistics" option to meeting the foreign language requirement became an especially attractive feature of the new program.

Students were further encouraged to select course work in linguistics by its being made one of the optional areas in which they could be examined as part of their required M.A. examinations. Students opting to be examined over linguistics, however, could not use their linguistics courses for the purpose of meeting the foreign language requirement. Such emphasis on language study was justified, I believe, because of the knowledge of language processes which the students gain -- knowledge which helps make them better understand not only the mental aspects of language processing, but also helps them better understand the conventions governing the written language.

The courses available to students, accordingly, constitute an eclectic assortment of "practical" and "theoretical" material. The following courses, accompanied by brief descriptions, form the core of the linguistics courses in which we try to place our technical writing students. The students' previous backgrounds in language study, as well as their career goals, help determine which specific courses we recommend.

Linguistics Courses

English Grammar: An introduction to traditional and structural approaches to English syntax; this course is especially valuable in equipping students with the traditional vocabulary expected of one who deals with language and is required of all students who perform poorly on a diagnostic examination required of all students entering the Technical Writing Option.

History of the English Language: A survey of the growth and development of the English language; while the course helps students better understand the phonological, morphological, and syntactic changes which English has undergone, and can assist them in developing their vocabularies, we seldom encourage students to take this course since we feel that others offer more valuable information for those concerned with contemporary language use.

Transformational Generative Grammar: An introduction to a modern syntactic theory which has had a profound impact on the study of language; this course not only acquaints students with such important concepts as deep and surface structure, langue and parole, and language competence and language performance, but also helps prepare them for psycholinguistic study from the perspective of cognitive psychology.

Descriptive Linguistics: An introduction to general language processes which focuses on the phonological, morphological, and syntactic components of language; students confront language problems based on data from various non-IndoEuropean languages, gaining insights into language in general, but more importantly gaining a fresh perspective on English. This course also makes students more aware of the problems of translating material from one language to another and may help them function more effectively in preparing manuals or instructional materials to be used internationally.

Linguistics and Literary Analysis: A survey of recent applications of linguistic theory to literary analysis; this course assists the student in dealing with language as discourse, rather than as a collocation of disparate sentences or words.

Language in America: A survey of the historical development of English in this country, as well as an examination of regional and social language variation, the language of advertising, sexist language, and other cultural dimensions of language; this course is especially important in helping students acquire a greater sensitivity to modern language usage.

Psycholinguistics: An introduction to recent cognitive studies of speech and language behavior; this course is for the advanced student of language who wishes to explore the relationship between language and mind, with a view towards developing a better understanding of why particular syntactic constructions are processed more effectively than others, why particular semantic concepts are retained more easily than others, or why particular rhetorical structures are grasped more readily than others. Investigations into these areas hold much promise for those interested in technical writing.

Because our Technical Writing Option has been in effect for less than a year, I have insufficient data to allow any meaningful analysis of the impact of linguistics study upon our technical writing students. I can report, however, that at least one person has been attracted to a field which we had not previously considered when examining the employment possibilities available to our graduates. Spurred on by his studies into the changes in the English vocabulary, one student has determined that he shall become a lexicographer!

DEVELOPING A MASTER OF SCIENCE DEGREE IN COMMUNICATIONS

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In September 1984 Eastern Washington University will begin a new interdisciplinary Master of Science degree program in Communications. This program has been under development for more than three years. (For a brief description of an earlier version, see "Proposed Master of Science Degree in Communication Systems," Proceedings 1982, pp. 12-13.) It combines the resources of nine departments--Applied Psychology, Communication Studies, Computer Science, Education, English (including Journalism), Management, Management Information Systems, Radio Television, and Technology--and stresses the interdependent nature of the various aspects of the communications field. The primary aim of the program will be to produce practitioners who are skilled in interpreting and creating information and in operating and managing today's complex communications systems. In keeping with the program's practical orientation, applicants will be required to have both a bachelor's degree and a year's successful work experience in some communications-related field. Courses will be scheduled in the evenings so that the program will be available to full-time employees.

The Master of Science in Communications will require a minimum of 60 quarter credits and will include four key components: a set of foundation core courses required of all participants (22 credits); a final capstone seminar also required of all participants (2 credits);

an interdisciplinary component designed by the individual student in consultation with program advisors (30-33 credits); and a thesis, research project, or internship, as appropriate to the individual's professional goals (3-6 credits).

The degree program was developed by a committee of representatives from all the participating departments. The developers concentrated on four major issues: giving the program a distinct identity, keeping an interdisciplinary focus, insuring the integrity and coherence of individual degree plans, and meeting the communications needs of the region.

The objective of programmatic identity was achieved by the design of a unique core of required courses (See Appendix). This core will give all degree candidates a common grounding in communications theory and practice. With the exception of Management 509, all the core courses were specially designed for the Master of Science in Communications. Most of them will be team-taught or offered concurrently with other core courses so as to stress the interdependence of all areas of communications.

During the final phase of the program's development an additional required course, a capstone seminar, was added in response to suggestions by outside program reviewers. This seminar will reunite the members of each graduating class during their final year and will reinforce their awareness of the common principles underlying their various specialties.

The core courses are explicitly interdisciplinary. The students will be required to maintain this interdisciplinary focus within the individualized components of their degree programs. Each student will specialize in two or three of the participating departments and will take at least two courses, totaling eight or more quarter credits, from each of his/her chosen departments. Typical program configurations might be 12 credits in each of two departments and 8 in a third, 15 credits in one department and 8 in each of two others, or 18 credits in one department and 12 in another. Students will be encouraged to acquire expertise in fields other than those of their undergraduate preparation. No one may take more than 12 credits in the field in which he/she holds a bachelor's degree.

Each participating department has prepared a list of courses approved for use in these individualized degree plans. In selecting courses from these lists, the students will work closely with faculty advisors from their chosen departments and with the Program Director. (The position of Program Director will rotate among faculty members from the participating departments.) Students who lack adequate preparation for particular courses may be required to take additional coursework in order to meet these prerequisites.

After completing his/her course plan, each student will undertake a research project or thesis or participate in an internship, as appropriate to his/her educational needs and career goals. The nature and subject of the final project will be determined in consultation with the student's advisors and the Program Director. Like the rest of the degree program, this final project must have an interdisciplinary focus.

As a regional state institution, Eastern Washington University is mandated to serve the needs of the Spokane area. In keeping with this mandate, the Master of Science in Communications committee consulted with local communications professionals during all stages of the program's development. An official nine-member advisory board is now being formed. This board will meet three or four times a year to advise the program faculty on matters pertaining to the relationship between the university and the professional community.

To date the new Master of Science in Communications has been favorably received by both working professionals and prospective students. The development phase has been long and arduous, but the planning committee is confident that this process has produced a worthwhile program. We anticipate further refinements as the program is implemented. Any significant changes will be reported in future volumes of these Proceedings.

APPENDIX

DESCRIPTIONS OF FOUNDATION CORE COURSES

PSA/COM 501 **Applied Communication Theory** 4 credits

Communication and psychological theory applied to the management of all levels of communication systems--individual, dyadic, group, and organizational. Intended as a beginning course for graduate students from diverse backgrounds. Provides integrated theoretical foundation for graduate study in applied communications areas.

CS 504 **Information Systems: Computers** 2 credits

Information as a scientific concept; the nature of encoding/decoding, security, and transmission. Computers as devices for creation, storage, processing, retrieval, and transmission of information. Multiplexing, networking, and other concepts of computer communication. Role and responsibility of users and decision makers toward information systems. (Offered concurrently with TEC 504 and RTV 504.)

TEC 504 **Information Systems: Design Graphics** 2 credits

Introduction to computer graphic layout and advertising with computers. New modes for communication in business and industries. (Offered concurrently with CS 504 and RTV 504.) Includes laboratory: 2 hours weekly.

RTV 504 **Information Systems: Electronic Delivery** 2 credits

Theory, technique, application, and management of electronic information systems including radio, television, microwave, data link, satellite, laser, etc. Designed for communication decision makers and consumers. (Offered concurrently with CS 504 and TEC 504.)

ENG 568/ COM 568/ ED 568 **Written/Oral/Visual Communications** 6 credits

A course designed for people in all fields of communication. Covers principles and practices of written communication, oral communication, and visual communication. Each student will select a project in a specific area of interest and will integrate the principles and practices of the three modes of communication into a finished presentation. (Students will register concurrently for ENG 568, 2 credits; COM 568, 2 credits; and ED 568, 2 credits.)

MGT 598 Crosslisted with 8 departments **Seminar in Consulting Processes** 2 credits

A course designed to: present the types of professional consulting and general approaches to consulting methodology; outline the basic knowledges, skills and, resources that are tools for consulting; introduce the nature and role of change; help each student evaluate personal skills and design a program to improve them.

MGT 509 **Management of Organizations** 4 credits

Intensive study of managerial roles in formal organizations within the dynamic business environment.

WHEN TECHNICAL COMMUNICATION IS THE ONLY HUMANITIES DEGREE

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AND
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At a technical institute in which all the degree programs lead to the Bachelor of Science in highly specialized, scientific and technological fields, how does a new degree offered in the Humanities Department, which has always played solely a service role, make itself credible and respectable to scientists and humanists alike? Our answer is a Bachelor of Science in technical communication that achieves parity with the [illegible]her programs at Tech through its demanding curriculum that balances coursework almost evenly between writing and the humanities, science and technology. In this paper, we will describe our program as it is now and as it was structured originally. Then we will discuss the first changes we have made in the program, barely a year into it, that have come primarily from having taught TC 202, "Technical Communication and Advanced Composition." This impossible course was purposely designed as an experiment to test how we might best address a central problem we faced in offering this new degree: what must we teach to prepare our students to make the leap in sheer literacy necessary for them to move from the freshman writing courses required of all Tech students to the specialized, highly sophisticated writing courses we planned for the new major.

The Program

The program is a Bachelor of Science rather than a Bachelor of Arts curriculum because of the nature of Tech itself. Currently, no Bachelor of Arts degrees are offered at Tech. The Bachelor of Science degree curriculum is well established and respected, and the dozen of us in Humanities had no desire to attempt to create and support a new Bachelor of Arts curriculum. We decided to focus our energies on the technical communication courses that would be created for the major. Thus our students take the same basic courses that all Tech students take. There are no watered-down, science-for-liberal-arts-majors courses in the curriculum. Technical communication students must compete for grades directly with students majoring in such traditional B.S. programs as physics, mining engineering, or metallurgy, to name only three.

The general degree requirements for the B.S. at Tech total 58 credit-hours, and they include 9 hours of written and spoken English, 15 hours of the humanities and social sciences, 8 hours of calculus-level mathematics, 18 hours of calculus-based physics and chemistry, and 8 hours of biology and/or geology. To these 58 hours, we added 6 more hours of social science and 6 hours of one foreign language to strengthen the liberal arts quality of the basic curriculum, giving a total of 70 hours of general requirements.

The technical communication major itself consists of both a major and a minor requirement beyond the 70 hours of general requirements. The minor requirement is a block of 12 credit-hours in science and/or technology courses. Students may take these hours in a single field or spread them out over several fields for a broad-field minor. When added to the 34 hours of science and mathematics coursework in the general degree requirements, the minor hours bring the total science and technology requirement to 46 credit-hours, approximately one-third of the total hours needed for the degree.

The major requirement is an integrated set of courses in writing, literature, and philosophy totalling 38 hours. The writing courses add up to 26 of these hours. There are three lower division courses. TC 201, "Orientation to Technical Communication," is a one-hour course that features guest speakers. TC 201 allows students to see the profession they are preparing for from the outset of their study and to begin to choose from the several different career options that technical communicators have. TC 202 and TC 211 are two new, three-hour courses that were created from the fissioning of the original TC 202, "Technical Communication and Advanced Composition." More on that later. The upper division courses consist of three, four-hour courses in proposal and manual writing, article writing, and report writing. These classes meet each week for three hours of lecture and one three-hour practicum, or lab, to give them their four-hour credit status. Students complete an industrial internship for three hours of credit and must propose, complete, and present both in writing and orally a major project for their senior seminar requirement of three credits. To this is added a one-hour word processing requirement that students take independently and satisfy by passing a series of examinations that test their skills in manipulating the computer. Students also must take 12 hours of upper division courses in literature and/or philosophy.

Putting the major coursework alongside the general degree requirements gives the full picture of the humanities side of this B.S. curriculum. It is ample. The 26 hours of writing courses in the major combine with the 9 hours of written and spoken English in the general degree requirements to make 35 hours in writing and speech. The 12 hours of literature and/or philosophy when added to the general degree hours in the humanities and social sciences (36 credits), give students 48 hours of study in literature, philosophy, fine arts, foreign language, and the social sciences. These courses all involve discussion, reading, and writing--the communication of information--in a humanistic manner, and are, therefore, central to the education of a technical communicator. We think of the complete major coursework as the combination of these 48 hours in the humanities with the 26 hours of specifically technical communication courses, making a total of 74 hours in the study of language and its milieu.

Fifteen hours remain to be accounted for in this 135 hour degree, and they are given to the student for electives. This group is a key element in the program. It allows students to take additional hours in any area of their special interest. Some take them in writing or humanities courses; but, in truth, nearly all we can offer in these fields is usually accounted for in the required curriculum. At Tech, students more often elect to increase their concentration in the single science or engineering field they have chosen for their minor requirement. Those 12 hours of classes, added to the 15 elective hours, can provide 27 hours of specialized work in a single field of technical expertise. Not only does this 27 hours produce an exceptionally strong technical minor to support the major in technical communication, but it also brings students close to a second major. As little as one semester's work--16 to 20 hours--in fields such as computer science, biology, or psychology, for example, would qualify students to graduate with a double major. Students who take their electives in science and technology complete a degree that has 54% of its credit-hours in writing and the humanities, and 46% in science and/or technology--almost a balance.

The profession of technical writing and editing currently employs people with a wide variety of educational backgrounds. Most come from the fields of English or journalism, though many have degrees in science and engineering. In its traditional structure, neither form of education produces an ideal technical writer. Most students with science and engineering degrees have minimal coursework in writing and the humanities, and most English and journalism majors have minimal backgrounds in scientific and technological fields. On the job, technical writers trained to be scientists and engineers balance weaker writing skills with their technical understanding of the tasks they face; the English and journalism technical writers must make the most of their stronger writing skills when they face their own problems understanding the technical substance of the projects they undertake. We feel that our program at Tech addresses this problem by balancing elements of writing, science and technology, and the humanities in a single curriculum. We hope to graduate prospective technical communicators who can fit easily and well into the wide variety of roles they will have to play to move outward and upward in this profession, and, further, to shape the on-going evolution of the profession itself by their example.

The First Changes: What Happened to TC 202

In designing our program, we knew that we would face several challenges getting it out of the committee meetings and into the classrooms. The first problem was preparing ourselves to create a half-dozen new courses in technical communication. We were confident of our ability to offer intellectually rigorous courses in upper division technical communication, but we knew we had to come up with something creative, given our existing course offerings, to prepare our students to take those courses. Thus a long range, more difficult challenge involved our traditional curriculum: the writing, literature, history, language, philosophy, and economics courses we already were teaching.

Nearly all had been designed and taught as service complements to the science and engineering curricula at Tech; and as such, not always do they address the intellectual needs of a technical communication major. The reading courses tend to be surveys that emphasize a general understanding of broad themes and plot structures. They do not emphasize the practice of close textual analysis that might best benefit a future writer or editor; and, accordingly, we offer no sophomore-level course introducing students to the history, theory, and techniques of textual analysis. Our freshman writing requirement is a two-semester sequence that teaches fundamental writing skills, culminating in a formal research paper project. It is tacitly designed to prepare students for our Institute-required service course in technical writing and its technical report project, not to prepare them to study literature or the history and theory of rhetoric.

Both of these aspects of what has been our service course curriculum are being re-evaluated now so that they may continue to function as service courses, but also be fully part of the new technical communication major. Perhaps one of us will report on our success, or something else, with that at a future CPTSC meeting. But the first changes in our program have come in response to the challenge of creating an introductory course, the sophomore stepping-stone, that would lead students out of second semester freshman comp and into the more analytical and theoretical world of a writing degree program. At first, we hoped to do this with just one course, TC 202.

The original description of TC 202 was "advanced study of tone, grammar, syntax, mechanics, and usage applied to the shorter technical forms. Use of copyreading and proofreading symbols and editing manuscripts for publication," which was an umbrella description we hoped would cover whatever would be needed to make up the hazily defined introduction to the upper division courses we wanted. The course was assigned to Dr. Sanders, and it almost immediately acquired a colon and a more descriptive moniker: "Language Theory and Editorial Practice." The pedagogical philosophy was to teach the analytical respect for text that a traditional English major should learn from the practice of criticism by having our students edit actual technical manuscripts, substituting editing practice for critical practice. They would prepare for the "editorial practice" part of the course (the final third of the semester) by undergoing an intensive review of basic grammar in the first two weeks of the term, and then studying, for about three weeks each, brief introductions to the three fields of language study that seemed to be most germane for a technical communicator: communication theory, rhetorical theory, and the history of the English language. It was obviously an impossibly ambitious menu for a fifteen-week term, but it was intentionally so. We hoped to find, in the act of teaching it, what the most relevant preparation for future editors and writers would be. Here's how it all shook out.

The two-week review of grammar was predictably superfluous for some, futile for others, and a moment of glorious syntactical revelation for two or three. Communication theory became a one-week glance at Shannon and Weaver, Chomsky and Skinner, and then a more detailed study of rhetorical theories of communication, which quickly became the introduction to the history of rhetoric. We took three weeks to reach the nineteenth century after having started with Kinneavy and then jumping back to Aristotle and working forward from there. We paused for three weeks at that point to skim back through a history of English, spent two weeks on a recapitulation of everything, and a final week brought us back to Kinneavy and a bit beyond. Our circuitous journey wound up with a major examination that sought to combine the history of the language with the history of rhetoric and demonstrate the relevance of our study to the four weeks of editorial practice that remained to finish off the term. The central question on that exam is reproduced at the end of this paper. It should indicate what we felt we had learned from teaching this material: that studying the history of rhetoric and the history of the language is the most effective way that we can introduce our students to the intellectual world and the analytical practice that advanced study in a writing degree entails.

We also discovered, predictably, that we need two courses, not one, to accomplish this preparation. TC 202 is now, simply, "Language Theory and Editorial Practice." It retains the review of grammar, expands the study of the history of English, and then focuses on editing technical manuscripts. It is an editing course, not a writing course. It emphasizes the tighter focus of editorial concern with the sentence, the issues involving word choice, syntax, and mechanics, which studying the history of the language lends itself to very well. Our students learn to use the word "elegance" when referring to writing in the same sense that they, or their more technical colleagues, have used it before to describe a mathematical proof, a computer program, or a geological hypothesis. For them, style becomes intrinsic yet analytical, not a technical skill that may be applied in varying degrees of ornamentation.

The other course, TC 211 "Rhetoric and Advanced Composition," is the writing course that applies the history and theory of rhetoric to the practice of writing longer essays and a technical report. This course employs peer-editing practices that emphasize the editor's broader focus, the rhetoric of the paragraph and of paragraphs, and other issues in writing beyond the structure of individual sentences. Communication theory may be mentioned in TC 211, but only briefly and then only in the context of the study of rhetoric. The course will be taught for the first time this fall. It is not retroactively required of those students who completed the original TC 202.

Conclusion

Our program addresses a major, current issue in the industrial and academic development of technical communication as a profession: what measure of balance between technical and humanistic preparation and ability should a technical communicator ideally have? As a former service department at a small technical institute, we are very different from any English department, large or small, that has been offering traditional English degrees; and our response to this question and our problems with the program we have developed are different as well. Our future graduates' practical preparation, both in the sciences and in the technical communication skills courses, will be very strong. We are sure of that. But the pressing responsibility facing us is to provide, beyond technical skills in writing and editing, the fundamental, enabling power of literacy, precisely the aspect of a writing education that traditional English departments would feel most confident about.

To do this, we are reviewing our traditional offerings outside of the major curriculum, and we have enriched the sophomore-level, introductory courses in the degree program itself because they must provide the literate, synthetic power that will finally transform this multidisciplinary Bachelor of Science curriculum into a unified field of study. Achieving a true balance is only superficially a matter of juggling classes and credit-hours. The real balancing power in our curriculum is in the humanistic philosophy we have brought to the program, in the primacy of literacy and of writing. Thus we have tried to demonstrate how a strong humanities background may be obtained in the context of a rigorous technical training.

APPENDIX ONE

Summary of the Curriculum for a Bachelor of Science Degree
in Technical Communication, Humanities Department
New Mexico Institute of Mining and Technology

General Degree Requirements 58 hours

From the 1983-85 catalog, pp. 40-41. Includes courses in humanities and social sciences (24 hours) and mathematics and basic sciences (34 hours).

Departmental Requirements 12 hours

6 hours of social science in excess of general requirements. 6 hours of one foreign language.

Technical Communication Major 38 hours

Three-hour courses in editing and rhetoric; four-hour courses in proposal and manual writing, article writing, and report writing; a three-credit internship; a three-credit project completed in a senior seminar; a one-hour word processing skills requirement.

Required Minor in Science and/or Technology 12 hours

Option A: Single Science or Technology. 12 hours in one scientific or technological discipline in excess of general requirements.

Option B: Broad-Field Science or Technology. 12 hours in several areas of science and/or technology in excess of general requirements.

Electives 15 hours

15 hours of courses in any field or fields.

TOTAL: 135 hours

APPENDIX TWO

COURSE DESCRIPTIONS: TECHNICAL COMMUNICATION MAJOR

TC 201 Orientation to Technical Communication

1 credit, 1 class hour
Prerequisite: English 112 (second semester freshman composition)

A survey, through field trips, lectures, and guest speakers, of the technical communication profession. Topics include writing, editing, proofreading, layout, mechanical preparation, printing, distribution, and theory.

TC 202 Language Theory and Editorial Practice

3 credits, 3 class hours
Prerequisite: TC 201

Study of the history of the English language. Intensive review of English grammar. Using copyediting and proofreading symbols. Editing manuscripts for publication. Integration of visual material. Group editing practice.

TC 211 Rhetoric and Advanced Composition

3 credits, 3 class hours
Prerequisite: English 112 (second semester freshman composition)

Study of the history and theory of rhetoric. Practice in writing the longer essay using a variety of rhetorical modes including the technical report.

TC 250 Word Processing

1 credit, 3 lab hours
Prerequisite: TC 201 and 202

Introduction to the use of a word processor. Students work independently in the computer lab and receive S-U (pass/fail) credit by passing a series of computer-directed examinations.

TC 301, TC 301L Report Writing

4 credits, 3 class hours, 3 lab hours
Prerequisite: TC 201 or English 341 (General Technical Writing)

Information gathering, assembly, synthesis, and production. Use of literature search, lab and field notes, interviewing, and the results of team research to produce technical reports.

TC 302, TC 302L Article Writing

4 credits, 3 class hours, 3 lab hours
Prerequisite: TC 201 or English 341 (General Technical Writing)

Reading and writing on scientific topics for general audiences. Writing and marketing publishable articles on scientific and technical topics.

TC 321 Internship

3 credits
Prerequisite: TC 202 and Junior Standing

Work during a school term or the summer in a technical communication field such as writing, gathering data, or production work, for an on- or off-campus publications agency or department. Appointments must be approved in advance by the Internship Committee of the Humanities Department if credit is to be received; credit is given for the student's written documentation of and report on the intern experience, not for the experience itself.

TC 421, TC 421L Proposal and Manual Writing

4 credits, 3 class hours, 3 lab hours
Prerequisite: 6 hours of TC courses

The use of technical communication in decision making and organization. Production of solicited and unsolicited proposals and/or operating manuals. Practice in team participation and team leadership.

TC 422 Senior Seminar

3 credits, 3 class hours
Prerequisite: Senior Standing in Technical Communication

Initiation, production, and presentation (oral and written) of a senior technical communication project.

APPENDIX THREE

Major Essay Question from an Examination in TC 202

Bringing Together Rhetoric, History of English, and Editing

Write an essay on language and the plain style that considers the quotations below. Do you now have a different perspective on some of the rhetorical theories we have discussed? Does Sprat's advice (and the more modern advice following it) stem from a mistaken assumption about the relation between word choice, the number of words in a text, clarity, and style?

". . . reject all the amplifications, digressions, and swellings of style; . . . return back to the primitive purity and shortness, when men deliver'd so many things, in an equal number of words."

--Thomas Sprat, *History of the Royal Society* (1667)

"Basic English is only a simple form of English. . . . The list of words has been cut to 850, which, it is pointed out, may be gotten onto a single page of note paper. . . . For the field of science, fifty words are necessary. These are all of a general nature. For each separate division of learning, it takes only one hundred more to bring us to the plane where all languages are the same anyway. Thus by learning only one thousand words, a man of any nation can read anything in his branch of science in Basic English."

--Edmund Andrews, *A History of Scientific English* (1947)

"Ordinarily the basic Anglo-Saxon word states things best in the English-American language, whether oral or written. Latin or Greek root nouns tend to express abstract rather than concrete ideas, except where they form regular technical or scientific terms (sublimate, ionize, radiate). But nouns ending in -ion, -ance, -ence, -ment usually need weak verbal units to clarify their meanings and almost always overword the text."

--from an in-house manual at a large computer
manufacturing company (1980)

kerd- HEART. 1. Suffixed form **kerd-en*- in Germanic **herton*- in Old English *heorte*, heart: HEART. 2. Zero-grade form **krd*- in: a. Latin *cor* (stem *cord*-) heart: CORDATE CORDIAL, COURAGE, QUARRY; ACCORD, CONCORD, DISCORD, MISERICORD, RECORD; b. suffixed form **krd-ya*- in Greek *Kardia*, heart, stomach, orifice: CARDIA, CARDIAC, CARDIO-, DIPLOCARDIAC, ENDOCARDIUM, EPICARDIUM. . . ; c. suffixed form **krd-yo* in Old Irish *cride*, heart: MACHREE. Possibly *kerd-dhə, "to place trust" (an old religious term; *dhə, to do, place), in Latin, *credere*, to believe: CREDENCE, CREDIBLE, CREDIT, CREDULOUS, GRANT.

--*American Heritage Dictionary*, First Edition, (1969).

The Writing Specialization--Preparing Writers for the World of Work

Elizabeth Tebeaux
Coordinator of Technical Writing
Texas A&M University

The Writing Specialization was launched at Texas A&M in 1977. At that time, communication skills, almost suddenly, became a major concern of employers. When the Writing Specialization was first conceived, Texas A&M had only one professional writing course, Technical Writing, which had been in the catalog since the 1930's. Between 1977 and 1983, enrollment in Technical Writing climbed from 700 per year to 2500 per year. Thus, the Writing Specialization, which became fully operational in 1979, was designed to provide opportunities for students entering the work place to broaden their communication expertise beyond the basic instruction that the single Technical Writing course could offer. However, the Writing Specialization was also intended to provide preparation for students interested in professional writing as a possible career option.

The initial plan for the Writing Specialization called for six courses: Argumentation and Composition (a sophomore-level course) and Technical Writing (for juniors and seniors) became the foundation courses. Technical Editing and Technical Speaking were then developed. In addition to these four courses, students pursuing the Writing Specialization would take two additional courses from their particular major area of study, but they had to be courses which required extensive writing in the particular field. For all six courses, students were required to earn a grade of "B" or better or be dismissed from the Writing Specialization.

The Writing Specialization is today an approved minor for 45 different degree options. Every year, the Department of English explains to students in freshman composition courses about the Writing Specialization--its goals and its advantages for students who are interested in acquiring top-notch communication skills. The program currently enrolls 80 students, including a growing number of English majors. Six internship positions with IBM in Austin, Texas, are now available for students who wish to gain professional writing experience before graduation. However, because Texas A&M is a large research university that has many communication centers on campus, most Writing Specialization students can find part-time or temporary writing/editing jobs throughout the year. The technical writing faculty makes extensive efforts to solicit writing opportunities for these students to enable them to strengthen their classroom activities with actual writing experience.

Before describing the four core courses in the Writing Specialization, I would like to point out that the English Department has avoided building a major in applied communication. Even as we planned the program, we believed strongly that students need a strong concentration in their major field—engineering, computer science, biomedical science, etc.—but the Writing Specialization could strengthen their communication skills and provide training in an additional career option. However, students would not be required to lower the quantity of work they needed in their major field of study. We also believed that students who had a thorough knowledge of their field plus communication training could become the best technical writers. While the department did not discourage English majors from the Writing Specialization to enhance their employability, we have strongly encouraged them to take a second major in business, computer science, or some technical field. English majors who have taken this advice have had little difficulty in finding employment following graduation. Given the crowded curricula in every major, we also believed that building a writing instruction program with more than six courses (four in English and two in the student's major field) would not be feasible.

I would now like to describe the four required English courses already mentioned and then outline changes we are anticipating in future course development for the Writing Specialization.

Argumentation and Composition

After completing freshman composition, Writing Specialization students are encouraged to take Argumentation and Composition. The purpose of this course is to help students develop an understanding of the uses of rhetoric and reason in argumentation. Learning tasks focus on seven objectives: (1) to use persuasion in personal and in professional writing; (2) to analyze audiences to determine what arguments are "best" for a particular situation; (3) to evaluate persuasive writing (such as articles of opinion, editorials, syndicated newspaper columns) and recognize propaganda by identifying its fallacies; (4) to evaluate reports based on inductive processes such as surveys and polls; (5) to evaluate arguments such as debates and political addresses; (6) to use knowledge of logic in writing and evaluating scientific reports based on induction; (7) to evaluate sales writing, advertising, and techniques of promotion. Assignments in Argumentation include a long research paper that argues an issue (e.g., reforms needed in public education, location of a proposed highway or dam, methods of training law enforcement officers). Six shorter papers are also required. These analyze arguments in editorials, position papers, debates. Students are frequently required to attend campus debates or political presentations and analyze arguments by speakers such as Phyllis Schlafly, Alexander Haig, or Jesse Jackson. In addition to the written assignments, students are responsible for an extensive reading list which is covered on examinations.

Technical Writing

At A&M, Technical Writing has traditionally been a course that covers a wide range of topics selected from both traditional "technical" writing courses and "business" writing courses: informal reports, formal reports, letters, memos, procedures, proposals, etc. Because curriculum in all departments is crowded, we have only one course designed to prepare students to write on the job. This course is limited to students of at least junior-standing, although 70% of the students enrolled in any semester are seniors. At least 50% of these are graduating seniors. Students enrolled in Technical Writing study communication models, audience, purpose, voice, style, graphics, and editing. They write a wide range of letters and reports. A formal technical report is required and a short oral presentation on some aspect of the formal report. Without extensive knowledge of their major field, students have difficulty in developing assignments. For that reason, more and more students are waiting to enroll until their senior year.

A typical class (22 students) includes students from 35 different majors, including computer science, pure science, agriculture, applied science, industrial engineering, engineering technology, industrial distribution, marketing, finance, accounting, and landscape architecture. For their formal report project, students, particularly those enrolled in the Writing Specialization, are encouraged to develop computer documentation, user's manuals to accompany various personal computers owned by the university, procedures manuals, and other "real" writing. I regularly solicit projects from departments throughout the university. For example, one of the Writing Specialization students developed a faculty information manual for the Department of Business Analysis. Another student developed materials for student recruiting (form letters and a brochure) as well as a graduate student information manual for the Department of Crop Sciences. As you would expect, Technical Writing is the most positively perceived course offered by the English Department.

Having students provide manuals and procedures for other departments has improved good will between our department and these departments. Another point—every year the marketing department conducts an exit survey of graduating seniors in the College of Business. For the past two years, over 80% of the students surveyed rated Technical Writing as the course they considered most valuable in their college studies.

Technical Editing

Technical Editing, the third course in the Writing Specialization sequence, is designed to further develop students' ability in planning, writing, revising, and editing both routine and special documents. The course has three other objectives: (1) to prepare students to adapt these skills to writing in their professional disciplines; (2) to enable them to evaluate critically professional documents in various technical fields and research areas; (3) to provide them with an overview of technical editors' responsibilities and to give them an understanding of technical writers' necessary background and possible career opportunities. Writing assignments in Technical Editing focus on kinds of writing not covered in Technical Writing: annual reports, news letters, brochures, news releases--typical documents that editors and technical writers are asked to produce. Students also have practice in revising and redesigning material in these categories. Word processing instruction is given at the beginning of the semester, and students are expected to do all assignments on the computers available in the university media center.

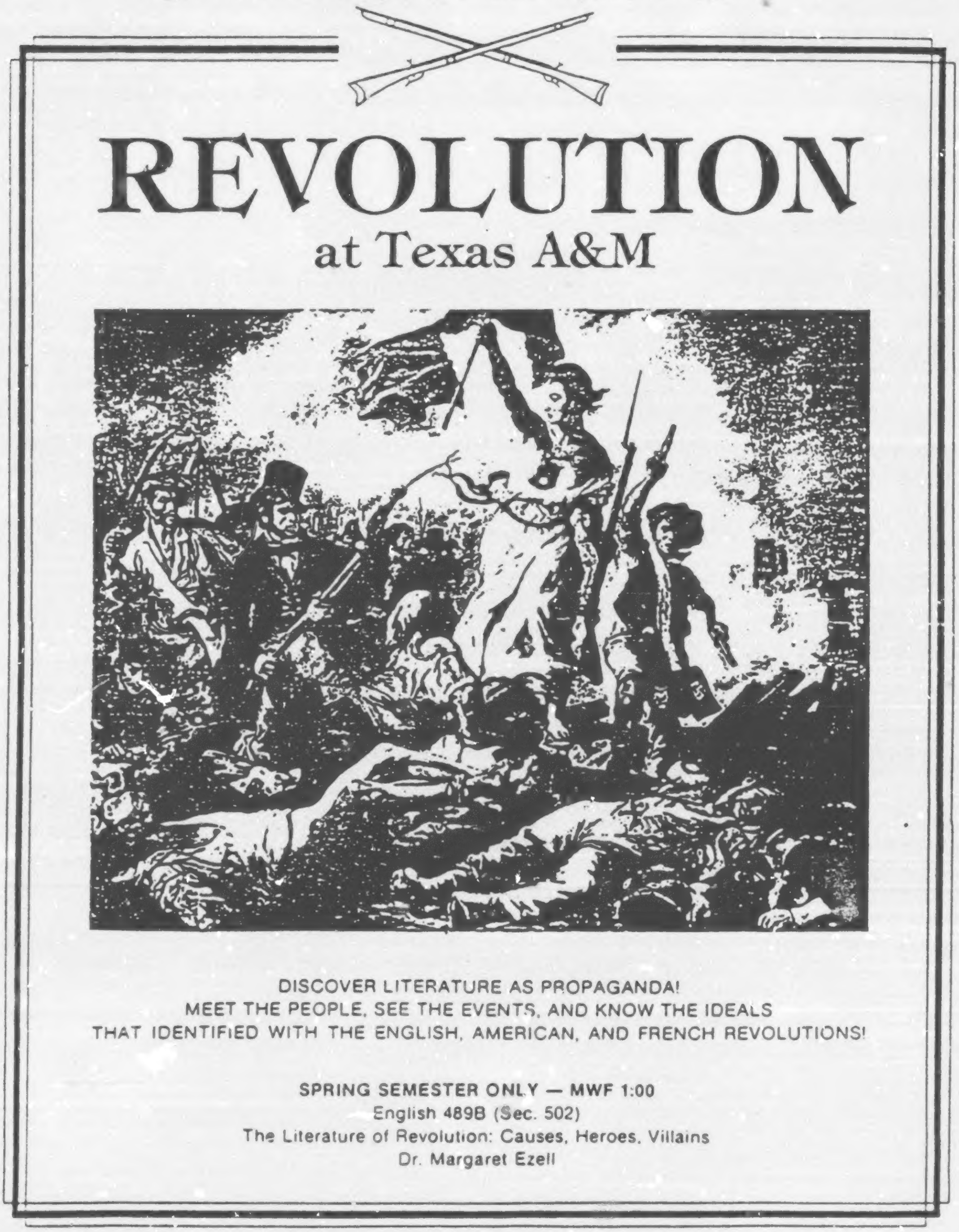
Technical Editing students also have the opportunity to learn editing by working with real documents. For example, last fall, the Department of Agricultural Economics hired the entire Technical Editing class (16 students at $5.00/hour) to edit and revise a 400-page report that was being prepared for the State of Texas. Students also have the opportunity to develop brochures to advertise trial courses that will be offered in many departments. After contacting the Technical Editing instructor, professors who want brochures designed to advertise a new course meet with the Technical Editing class to discuss proposed course content. Students then design a brochure, sometimes several from which the faculty member may choose the most valuable one. (See Figure 1.) Currently, the Technical Editing students have more requests for brochures than they can do! In fact, local businesses have also begun to contact the English department to ask for help. In this case, the business pays for the entire project.

Technical Editing also requires extensive reading, computer graphics instruction, and tours through the university printing center and the Texas A&M University Press. However, Technical Editing is not just another journalism course. While students do consider format, layout, and production procedures, the emphasis is on development and revision of documents based on effective rhetorical strategies. The prime objective of the course is "to apply principles of voice, purpose, and audience adaptation to your communication so that readers find the communication for which you are responsible to be clear, accurate, complete, and effective."

Technical Speaking

Technical Speaking, the final course in the four-course sequence, was developed as a companion course to Technical Writing. Like Technical Writing, Technical Speaking focuses on communication theory, audience/purpose/voice analysis. In addition to instruction in standard presentation methods, students give oral versions of topics taught in Technical Writing: (1) the technical process speech, during which the student explains a process in his/her field; (2) the proposal and progress report for a major project in which the student is involved in a course in the major field of study. In addition, students learn how to interview and be interviewed by participating in mock interviews. They also learn small-group communication techniques by leading a group in discussing, analyzing,

Figure 1: Brochure Designed to Advertise Experimental Course



REVOLUTION

at Texas A&M

DISCOVER LITERATURE AS PROPAGANDA!
MEET THE PEOPLE, SEE THE EVENTS, AND KNOW THE IDEALS
THAT IDENTIFIED WITH THE ENGLISH, AMERICAN, AND FRENCH REVOLUTIONS!

SPRING SEMESTER ONLY — MWF 1:00
English 489B (Sec. 502)
The Literature of Revolution: Causes, Heroes, Villains
Dr. Margaret Ezell

and hopefully devising strategies for dealing with a campus problem. Following the group discussion, each student writes a report evaluating the success or failure of the group discussion, the leadership that surfaced, the control methods exhibited by the group leader, the rapport that did/did not develop during the discussion, and what could have been done to improve the effectiveness of the problem-solving effort. In developing the report, students are to write an analytical report and show report-writing skills taught in Technical Writing.

The final assignment requires the student to conduct an interview with a management person in a business organization. The purpose of the interview is to enable the student to learn how the communication process works within that particular organization--how information is disseminated, what communication problems exist, how the person uses communication to achieve goals. Based on this interview, the student will write a second analytical report explaining the results of the interview. As the syllabus states, "This assignment is designed to provide you with initial experience in conducting an interview and deepen your appreciation for the interplay between the quality of communication within an organization and the experience of working in the organization. What, for example, does the quality of the communication in the organization (as you perceive it from the interview) tell you about the organization?"

Proposed Changes

The Writing Specialization committee is currently working to design several new courses to provide more course options for students. While Technical Writing and Technical Editing will remain required courses, students will have the option of taking one of the following three courses instead of Argumentation and Composition:

Analysis of Language. In this linguistics course, taught by a linguistics professor who teaches Technical Writing, students will be required to analyze language patterns in scientific and technical publications and compare these with language patterns in literary discourse.

Analysis of Composition. This course, which has been in the English department's curricula since the 1960's, is now taught by one of our rhetoricians who also teaches Technical Writing. This course will be redesigned to focus on analysis of referential, informative, persuasive, and literary discourse to determine the rhetorical features that create excellence for each kind of discourse. Our current plans are to use common essays, articles, and short stories in both Analysis of Language and in Analysis of Composition. Students would then be able to study linguistic and rhetorical features of the same works. We also believe that both these courses, which are now required for English education majors, would provide even better preparation for students training to teach secondary school composition and rhetoric.

Computer Documentation. We now have on our staff a teacher who wrote computer documentation for two years. She is designing a course that will be offered under the "Special Topics" heading. If the course succeeds, it will become a permanent course. We plan to encourage all Writing Specialization students to take this course, even as an additional course, if at all possible. We believe that a number of computer science majors will enroll after taking Technical Writing.

Evaluation

The Writing Specialization has been successful, far more so than we had ever expected it to be. Graduates of the program who have specifically sought technical writing jobs have found them. Other students, such as engineering students in the program, report that the extensive knowledge of communications that they gained has helped them significantly on the job. However, the main value of the Writing Specialization lies in its success in attracting students into English courses. Many of these students, eager to broaden their career options, would have taken only freshman composition and perhaps Technical Writing. However, the public relations value of the program has been the most pleasant surprise of all. More and more departments, with material to be edited or written clearly, are recognizing that our department can and does train reliable young writers who can deal with their communication needs. This positive publicity has also attracted a growing number of graduate students into our Writing Specialization courses. Many of these graduate students come to us because they are considering a possible career in writing or editing. Similarly, English majors have a means of improving their career opportunities, particularly if they are willing to broaden their background in business and computer science.

But perhaps the greatest thrill we have had came the day that IBM told us that they were offering us six internships rather than one! This was a particularly satisfying moment because we had wondered initially if we could do a satisfactory job of training future technical writers with only a minor (six courses) to work with. With a degree in technical communication out of the question, we decided to "give it a try," and it works: students are able to get basic preparation in professional communication while still having a solid major in a discipline of their choice.

THE CERTIFICATE PROGRAM
AT SAN DIEGO STATE UNIVERSITY

SHERRY BURGUS LITTLE
DIRECTOR, TECHNICAL WRITING PROGRAM
SAN DIEGO STATE UNIVERSITY

Since May, 1982, the Department of English and Comparative Literature has offered an interdisciplinary certificate program in technical and scientific writing at San Diego State University. The program developed as a result of an interest in securing marketable job skills for graduates of the College of Arts and Letters. A similar interest existed in the College of Sciences for its students.

Because people skilled in technical and scientific writing are increasingly in demand by industry, technical writing is a viable occupation for students in nontechnical degree fields if they have some technical and scientific courses, and it is equally suitable for the technical and scientific students who have good writing skills.

THE PROGRAM

The certificate program consists of 21 units. All students must complete nine units of required courses, as listed in Figure 1. Students must also complete an additional 12 units of recommended courses. These courses will vary

Department of English & Comparative Literature
College of Arts and Letters
SAN DIEGO STATE UNIVERSITY

Technical and Scientific Writing Certificate Program

Required courses: (9 units--gpa 3.0 or better--no C/NC)

English 500W	Advanced Composition	(3)
English 304W	Technical Writing	(3)
English 579	Topics in Technical Writing	(3)

Highly Recommended Courses:

Graphics (Mechanical Engineering 190 Engineering Drawing; Mechanical Engineering 195 Engineering Design, Graphics, and Processes; Industrial Arts 121 Industrial Drawing; Industrial Arts 181 General Graphic Arts; or equivalent)

Computers (Math 107 Introduction to Computer Programming; Information Systems 180 Principles of Information Systems; Information Systems 280 Advanced COBOL)

Classics 130 Scientific Terminology

English 499 Internship in Technical Writing

Other Recommended Courses:

Statistics (Math 119 Elementary Statistics; Economics 201 Statistical Methods; Political Science 201 Elementary Statistics for Political Science; Sociology 201 Elementary Social Statistics; or equivalent)
Oceanography 320 The Oceans
Philosophy 120 Logic
Industrial Arts 161 Basic Electronics
Botany 200 Introduction to Botany
Zoology 200 Introduction to Zoology
Natural Science 311 Readings in Physical Science
Natural Science 317 Development of Scientific Thought
Physics 107 Introductory Physics
Chemistry 200 General Chemistry; Chemistry 160 Introductory Biochemistry; or equivalent
Natural Science 102 Physical Science
Mechanical Engineering 260 Engineering Materials
Mechanical Engineering 310 Engineering Design
Biology 215 Introduction to Quantitative Biology; Biology 261 Human Physiology; Biology 362 Principles of Human Physiology; or equivalent
*Upper-division writing (English 582W The Writing of Nonfiction; or equivalent)

Total units required: 21 units

*For students in scientific or technical degree fields only.

Figure 1 Courses for the Certificate Program

according to the backgrounds of students. Those students with technical or scientific backgrounds must concentrate their courses in writing; those with nontechnical or nonscientific backgrounds must concentrate on either a technical or scientific specialty. Highly recommended courses for all students are graphics and computer classes.

Students have a great deal of flexibility in establishing their programs. They develop a program after consulting with the Director of the program, who must approve the courses they select, thus allowing an individualized program for each student.

INTERNSHIP

When students finish the required courses and nine units of the recommended courses, they may elect to enroll as interns. During internship, students are assigned to work with a technical writer or in a technical publication department where they are involved with writing projects under the joint supervision of the intern's industrial coordinator and the course instructor. It includes a project and internship conferences, with at least one visit by the instructor at the job site.

A technical writing advisory committee helped in developing the program and continues to meet to evaluate the program and to offer suggestions for resolving problems.

Because technical writers and publication managers from the San Diego County area are members of the committee, the curriculum reflects current employment demands and the advisory committee helps maintain community and industrial input for the placement of interns and students who have completed the certificate program.

A TECHNICAL WRITING PROGRAM: IMPLICATIONS OF RESEARCH AND EXPERIENCE

Carol Lipson
Assistant Professor, Technical Writing
Syracuse University

Let me begin by first explaining that at Syracuse University, we do not have a technical writing degree program -- neither at the undergraduate nor the graduate level. When I was hired, my mission was to run service courses at the undergraduate level. In addition, the department was interested in preparing graduate students for teaching and writing jobs in the field. I have never been one to believe one magic course would do the trick; thus I began thinking in terms of a graduate concentration in writing and technical writing. At the same time I was hired, the department also hired its one expert in composition theory. He was responsible for all levels of composition -- graduate and undergraduate -- beyond the freshman level. I was responsible for all levels of technical writing. We put our heads together.

At an earlier CPTSC meeting, in Seattle in 1981, I presented the results of my preliminary thinking on the composition of a graduate concentration in technical writing at Syracuse University. Some of those components came into place immediately; some were delayed. While we are still not in a state whereby we can announce a graduate program in composition, we do have an array of attractive offerings for those students interested in pursuing composition studies at the graduate level. Some difficulties remain, which I will describe. First, I will address the undergraduate situation.

Our undergraduate program has now grown from three sections per semester to about 10 sections of a 400-level course, and a thriving extension program. All of these courses are in heavy demand; students ask for more sections, and more courses. I have recently added several, included in a listing below of our undergraduate offerings.

The first new course, The Writing of Science, is an analytical course rather than a skills course. Our science and engineering students do have to take humanities and upper-division writing credits; this course should prove attractive to them. It will nicely complement what we do in the technical writing skills course. By examining major figures in the history of science writing, along with the scientific ideology their writings present and replace, and the cultural contexts the writers are operating in, the course will illustrate the effects of the various relationships on the resulting writing. Students coming out of it will become deeply aware of how language has been and is being used in the scientific community, and why. Such an awareness can substantially benefit the students in their future professional handling of science writing, while enhancing their understanding of language use in general. I already do this with graduate students in a technical writing theory and history course. Now I am going to try to bring this down to the undergraduate level.

The other undergraduate courses added are advanced workshops. These will allow qualified students to receive extended experience in handling a variety of more sophisticated projects than are possible in the prerequisite introductory technical writing courses. With these workshops behind them, students will be able to present themselves to industry and academia with extensive writing experience behind them. Until we get more faculty in the area, graduates and undergraduates will be in the same sections; graduate students will register for the 600 level workshop, and undergraduates for the 400 level. I will simply ask for more substantial efforts from the graduate students. In fact, though, readiness for such writing does not delineate itself around graduate/undergraduate distinctions.

In addition, we made significant changes to our existing undergraduate courses as a result of pedagogical implications of current theory. Our technical writing classes had been vastly heterogeneous groups, in a course with the generic title Report Writing. Yet research in a number of fields is converging to show the contextual influences on the communication in many specialized fields, and the power of the conventions in certain of these fields, especially fields with strong ethos involving strong commitment to established procedures. As a corollary of such theoretical thinking, we might not be serving such students well if we do not study with them the particular communication approaches of their fields, if we treat all specialized writing as generalized forms of business writing, for instance. Theory suggests that we familiarize such students -- be they natural science students, social science students, legal students, business students, industrial design students -- with the discourse conventions in their fields, and help them to operate within such constraints as felicitously as possible. We would want to help them to see how much variation they can introduce and still sound as if they fit. We would also want them to learn to write creatively, as much as possible without constraint of conventions -- in case they possess such freedom.

Thus I felt our mission in teaching such specialized groups becomes complicated. We should introduce them to their discourse communities and the discourse conventions; they should practice analyzing approaches to discourse. They should develop facility in varying and manipulating styles. Heterogeneous mixtures in our classes made this rather difficult. With students from many different specialized communities, with many different writing approaches and conventions, we ended up teaching five courses in one.

As a result, I have made certain alterations to our program. Primarily, I changed the title of our major upper-division course from Report Writing to Technical Writing. It was called Report Writing for historical reasons, from before my time. The new title, Technical Writing, clarifies the purview of the course, alerting the students who come thinking they are getting some amorphous form of business writing that this is a rigorous course in technical writing. This name change should help toward solving the pedagogical problem of the mixed audience. We're considering how we can further delineate the grouping for registration. I have quite deliberately entitled the course Technical Writing rather than Technical Communication; I am aware I am separating myself from the mainstream in this. I am doing so on the principle that communication suggests transmission as criteria. Theory is showing conclusively that the how becomes part of the what, part of the meaning. I wanted to focus attention on the how, on stylistic options, on effects other than simply cleear transmission of content. I have used the traditional title, Technical Writing, to do so.

This change will provide us with a 400-level course geared for engineering and science students; we already have sections devoted to environmental and landscape design students. In addition, our composition interest group in the department has proposed that we change our modes-oriented, junior-level composition course to a course focusing on writing in discourse communities. Such a course would, in our plan, offer sections for social science students, for students preparing for management communities, and for students interested in the writing of government. Such a course would nicely complement the focus and purview of the technical writing course, which serves the scientific and technical discourse communities. This change is still at the planning stage; logistics and staffing appear to be major hurdles.

At the graduate level, we now have a range of substantive, relevant offerings. In technical writing, we have an introductory course presenting history and theory, with some preparation for pedagogy and practice. We now have a graduate workshop in technical writing, in addition to a formal continuing graduate internship. In the past, the internships I arranged were ad hoc affairs, taken under an independent study rubric. I had to make new arrangements each time. In the conservative, elitist environment of the humanities at SU, it was not clear how an experience credit graduate course would fly. I decided this fall the time was ripe to try. I now have placed the internship concept formally before the relevant committees on campus, and it passed through easily. We chose two students to work at the company: Magnavox. Magnavox intends to take new graduate students each semester. Though no pay is involved, student interest was great. (The first two interns were offered summer positions with pay).

We also have a series of intensive composition graduate courses. One covers contemporary theories of language use and language development. Another reviews major inquiry paradigms in research on writtten language, with their associated methodologies. Students in this course will prepare a proposal for an individual research project on written language. The research project itself will have to be carried out under the independent study system, at present. In addition, we have an existing graduate course in rhetoric, with a historical focus; we also have a course on the teaching of college composition, as well as a course on pedagogy for English as a Second Language. These courses are listed below, with descriptions.

All in all, then, we do have a rather full complement of offerings for graduate students wishing to pursue composition studies here. Graduate students have also been taking some profitable related courses in other departments, particularly on the theory and practice of visual communication, and the theory and practice of organizational communication. Our problem is that the masters level students -- who comprise most of our graduate student body -- are required to take three comprehensive examinations to receive their degrees. These exams are presently mostly literary in focus. Only one of the three examinations can now be in composition and technical writing theory. The second exam involves explication of texts, and the Graduate Committee of he department appears to have agreed to allow a limited number of questions involving explication of non-literary texts for suitably prepared students. Such questions will, however, be in the minority. The third exam involves critical essays. Again, we have received approval in principle to include questions on nonliterary discourse. This has not yet been worked out in practice, however. I am frankly uncomfortable with advertising the availability of a graduate program, if students concentrating on composition and technical writing find themselves at a disadvantage in the exams they must ultimately face. Until this problem is resolved satisfactorily, we cannot solicit students, though we will continue to serve students here who show enough of a commitment to weather these obvious disadvantages.

Besides such program expansions, SU has confronted other major developments in technical writing: administrative ones. We lost most of our experienced teaching staff. As the only faculty member in technical writing, I have generally been supervising 12 people a year: 6 teaching assistants and 6 part-timers. Five of these teaching assistants teach a 10-week module in Freshman English on technical writing; one teaching assistant handles our upper-class course. I try to keep the freshman level people a few steps ahead of the students, choosing those who have some sort of relevant experience: a course, a job, a specialized academic background. The problem is largely with the upper-level course, which requires many sections. We decided to depend mainly on part-timers, since they traditionally stay longer; most of our teaching assistant are masters students, who can teach only for two years. It is difficult to put a 21-year old who knows very little about technical writing in front of a senior-level class. Most of our TAs are also just beginning to learn to teach writing; our part-timers are far more experienced teachers of writing.

Thus I trained a group of our best part-timers to teach technical writing, and they did a superior job. But our university exploits part-timers. They cannot receive funding to attend workshops such as at RPI or Michigan. They have been paid only about $1600 per section. Once these people knew something about technical writing, they became attractive to industry. I myself fielded all sorts of opportunities to them. Even those who wanted to work part-time found such possibilities in industry to be far more lucrative than employment with us. Not only that, but other units within the university offered them up to three times our salary for teaching there. We were caught in a bind. I remain in a bind; essentially unable to offer a hand-holding course as part of my teaching load to prepare teaching staff, I have to do it as extra service.

All of our part-timers seek improvement in their lot, not just the technical writing crew. Our part-timers have to meet stringent standards to stay on; they are reviewed yearly, and the competition is stiff. Since they're being judged so intensely, a department committee looking into the problem recommended that the writing faculty -- at least, four of us -- must now give the part-timers larger chunks of time for supervision, preparation, and evaluation. That is undeniably laudable in principle, but the department's executive committee said no in practice: the four writing faculty are already overburdened running writing programs, with no teaching release allowed.

The Dean has taken a step toward improving the administrative structure (lack of it really) for running large composition programs. He is funding a study by outside evaluators to give him recommendations. The politics are such that it may be months before agreement can be reached on how to do the study. This will be a long, slow process. But relief is in sight.

I do not believe SU is unique in these difficulties. They illustrate what can happen if a writing program is allowed to grow without adequate provision by the administration for supporting it and running it. Let that set a cautionary note for other programs. If from the outset you don't negotiate proper conditions, you may find the program being run on a shoestring, with a burden of overload on your back. Beware.

UNDERGRADUATE COURSES IN TECHNICAL WRITING AT SYRACUSE UNIVERSITY

English 102	10-week minicourse in Technical and Business Writing.
English 306	The Writing of Science Major figures in the history of science writing and major related theoretical issues, including the effect on the writing of the scientific ideologies represented and the cultural contexts.
English 404	Technical Writing Principles and practice of the writing required in technical fields or professions. Attention given to problem-solving approaches for design of technical

documents, and to style. Analysis of discourse communities and associated conventions.

English 419 Advanced Technical Writing Workshop

Intensive experience in the writing of technical texts. Acceptance requires permission of instructor. Prerequisites: English 404 or equivalent, and permission.

TECHNICAL WRITING AND COMPOSITION GRADUATE COURSES AT SYRACUSE UNIVERSITY

English 505 Methodology of Teaching English as a Second Language.

Consideration of language teaching theories and methods, with application to the problem of teaching English as a foreign or second language.

English 507 Contemporary English: Theory and Practice

Structures of the English language, using generative/transformational grammar. Implications of contemporary linguistic theory for reading, "standard" usage, teaching of composition, English as a second language or dialect, and literary style.

English 604 Technical Writing

Principles and practice of the writing required in technical or scientific fields or professions. Attention given to style and to problem-solving approaches for design of ttechnical documents. Analysis of discourse communities and associated conventions. Not acceptable towards the MA Degree in English.

English 612 Technical Writing: Fundamentals of Practice, Theory and Pedagogy

Introduction to contemporary theory in technical writing. Historical context provided through examination of texts. Student mastery of some major forms of technical writing. Discussion of special concerns, methods, and materials for teaching technical writing.

English 613 Teaching College Composition and Literature

Presentation and discussion of various classroom and paper-grading techniques for teaching college composition and literature. Evaluations of the student's own teaching.

English 614 Written Language: Theories of Language and of Language Development

Review of major contemporary theories of written language and of language development. Examination of current interdisciplinary approaches to studying written language, and synthesis of recent research and theory to construct an overview of written language development.

English 619	Advanced Technical Writing Workshop Intensive experience in the writing of technical texts. Acceptance requires permission of instructor. Prereq: English 404 or 604 or equivalent, and permission.
English 670	Graduate Internship in Technical Writing: Experience Credit.
English 714	Research in Written Language Review of the major inquiry paradigms in written language research -- experimental, rational, and phenomenological -- and the associated methodologies, and examination of representative pieces of research. Preparation of proposal for individual research project. Requisites: English 614.

AN IN-HOUSE WRITING PROGRAM:
TEACHING THE WRITING PROCESS IN A LABORATORY SETTING

IRENE D. HAYS
MANAGER, WRITING WORKSHOPS
BATTELLE, PACIFIC NORTHWEST LABORATORIES

In 1980, after teaching in public schools for thirteen years, I joined a large scientific research and development laboratory as a technical editor/writer. In addition to editing and writing, I soon began developing and teaching courses in technical writing for the laboratory staff. The writing program I now direct has grown to include four instructors, and three basic courses are offered regularly. I will describe the setting, the students, the courses, and the instructors in that program.

The Setting

The setting in which I teach is Battelle's Pacific Northwest Laboratories located in south-central Washington State. It is a division of Battelle Memorial Institute, the world's largest independent institute conducting scientific research and development. Our division of the Institute in Washington State also operates the Pacific Northwest Laboratory at Hanford for the U.S. Department of Energy.

At the Laboratory, we conduct a wide range of interdisciplinary research and development. Included are developing technologies for turning nuclear waste into glass; irradiating apples to control insect pests; splicing genes; recovering strategic metals from spent nuclear fuel; and working in "high tech" areas, such as image processing and artificial intelligence. All research and development is conducted under contract with government agencies and private companies. Our work last year included over 1000 contracts with several hundred sponsors.

The Students

Our students, the staff at Battelle, include 2700 scientists, engineers, technicians, and others with expertise in virtually every technical discipline. Also included is the support staff. More than two-thirds of the research staff have advanced degrees.

When the scientists and engineers--our students--work on scientific or technical projects, they must write about them to their peers, to their supervisors and managers, and to the sponsors of the work, and sometimes to the public. Technical reports are their main writing products. They must take each report through many stages in the writing process. It has to be reviewed by all who have a stake in the work and then, usually, revised and rewritten. The deadlines for the writing are real. And, perhaps most important, the payoff is in real time: the success of their projects and their professional advancement often depend in large part on their ability to write effectively.

In their writing, the scientists and engineers are supported by technical editors, technicians, secretaries, clerks and others. We offer courses also to those who work in these capacities. These, then, are our students.

The following statement by an engineer sums up the need for courses in technical writing:

> In college, I had sixteen semester hours of calculus and only three hours of English. Since graduation, I haven't worked a single calculus problem, but I write four hours a day.

I hear similar stories every day from the scientists and engineers who attend our writing courses.

Our students accept the opportunity to take writing courses because they know they need help in their writing. They are generally not prepared for the amount and the kinds of writing they must do. Responses to our questionnaires on writing indicate that the average scientist or engineer devotes 45 percent of his or her work time to writing. Now that is only an average. Some spend much more time than that on writing. And yet, 88 percent of those questioned said that they received in the schools--high school, college, or graduate school--little or no specific instruction in writing that is of any value to them in their work. Among them are those who have taken formal courses in technical writing at colleges and universities.

Our students have opportunities to take writing courses offered by other institutions in the area, but most choose to take our courses. Our program, we believe, adds value to the scientific or technical product from the earliest stages--that is, upstream--in the writing process.

The Courses

We regularly offer three basic courses. EFFECTIVE TECHNICAL WRITING, the staple of the program, is designed for scientists and engineers. EFFECTIVE CORRESPONDENCE is designed for office workers, those involved in producing memos, letters, short reports, and other office correspondence. WRITING EFFECTIVE PROCEDURES AND INSTRUCTIONS is designed for those who must write administrative and scientific procedures. The content of this course is being expanded to include computer program documentation.

We also develop and conduct courses tailored to the specific writing needs of a department or section. Often we generate new components for a tailored course, sometimes combining them with components taken from other courses. For example, we are currently conducting a series of workshops for our entire staff of financial specialists.

We recently conducted a pilot workshop for those who have taken EFFECTIVE TECHNICAL WRITING and who are now using a computer for their writing. We examined the processes authors use when writing on a computer and related them to the principles we study in EFFECTIVE TECHNICAL WRITING. We expect this to be a popular course.

Each course consists of twelve hours of instruction--four sessions, each three hours long, distributed over two weeks. They are, however, much more than "short courses." Because our students are highly motivated to be effective in their writing, we can compress much into each class session. The work environment expands and extends the learning.

First, learning is expanded because the students immediately apply the skills and techniques practiced. The courses are extended because the instructors are constantly available to take phone calls from students and meet and consult with them on writing problems. In other words, we respond to students' writing needs as they surface.

The courses are also extended by the laboratorys' staff of approximately 30 technical editors. They support, reinforce, and sometimes tutor the writers as they assist them in the daily routine of producing and publishing documents. The editors are familiar with the concepts and skills taught in our courses.

In these ways, what could appear to be a series of short training classes, or an attempt at a "quick fix", has, in our setting, an impact far beyond the four intensive sessions.

Perhaps I should mention that our courses are not free to participants. Though they are held on company time, we charge a fee. The fee, along with time charges, may run from $700 to $1000 per course for an average participant.

The fees pay for the program, which is run as a cost-recovery business. We are in business so long as we have clients. I'm happy to say our business is thriving. For the most part, no one is required to attend our courses. In our setting, when we are effective, we know right away: enrollment will be high. But conversely, if we are not effective, we will have no courses and no program.

Effective Technical Writing

Let me give you an idea of the concepts and skills presented in EFFECTIVE TECHNICAL WRITING, our basic course for the scientists and engineers. First, it is not a course in how to use the company style guide. Nor is it a format-specific course, though we use some formats as models. It is a course that teaches the basic skills for writing technical reports and articles, because that is what our students need most.

The course includes techniques for getting started; overcoming writing blocks; interpretating data; and expanding and exploring topics. We present strategies and exercises for identifying and understanding audiences; organizing content relative to purpose and audience; and revising and rewriting effectively. We suggest and model ways to respond to reviewers' comments; sharpen and strengthen sentences and words; and control readability at every level from the whole text down to the word.

For materials, we have developed our own. We have found no suitable ready-made materials or text. In EFFECTIVE TECHNICAL WRITING we use approximately 100 handouts, and about two-thirds that number of viewgraphs. Most of them were created or collected over the years from our students' writings. In developing curricula, we have studied and continue to study the state-of-the-art in teaching writing and learning to write. We are applying the best of current research findings on teaching the technical writing process.

The Instructors

At this time, four instructors teach in the program. All are experienced teachers. Two have taught and continue to teach for universities: one teaches a technical writing course for Central Washington University and I teach a similar course in the Engineering Department for Washington State University.

Our instructors also are experienced, working technical writers and editors. This means that they understand the company's policies and procedures; they know the work--the research--and the different audiences and sponsors. And, often, they know the differing communication abilities of the students who participate in a particular course.

Are our courses successful? We think so. They bring people together to discuss and, we hope, solve problems that are common to all writers in our kind of work. They build an atmosphere in which writers can discuss freely the problems they face without feeling their scientific or technical knowledge is in question. We strive to shake up old habits of thought and expression enough so that the writers are no longer satisfied with the standards of clarity they once accepted from themselves and from others.

Students continue to come forward to participate in the program. Over the last year, we doubled the number of times we teach each course, and nearly tripled the number of staff members attending. We generally have a waiting list of students.

Other Students and Programs

I have not yet mentioned some of our other students, our preprofessional staff from high schools and colleges. These students are in programs that allow them to spend time in the laboratory working under the direction of researchers. They participate in our cooperative programs with universities, colleges, and high schools. Our writing courses for these students support the teaching of writing across the curriculum and assist in the teaching of mathematics and science.

Our work in the local schools includes a student technical writing contest that I direct for the local chapter of the Society for Technical Communication. Through it and other programs, we conduct workshops for students and teachers in nearby schools. In addition, we have proposed, and hope to receive funding for, an inservice program in teaching writing for science instructors who teach at the local community college.

Looking Ahead

I think of our writing program as a laboratory for investigating the writing processes of working scientists and engineers. I also envision ways to enhance our connections with writing programs in academic settings. Last year we participated in a research project with Washington State University. In the project, we collected samples of writing from some of our students under specified conditions. The samples are now being analyzed by the University to help reassess the training in composition that Washington State colleges and universities give and the relevancy of that training to on-the-job writing. There may be interest in doing more of this.

I see value in reporting what we observe of the sometimes synergistic merging, in our setting, of the two processes of discovery: writing and science. These observations could contribute to extending the state-of-the-art in teaching writing and learning to write. The information should assist the schools in preparing future scientific professionals.

I have a special commitment to do this. For I have not yet recovered from the shock of the disparity I observed when I first began teaching in this new arena--the disparity between what the schools were teaching about writing and the skills necessary for effective writing in the world of science and technology.

ROCHESTER CO-OP IN TECHNICAL COMMUNICATION

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COLLGE OF CONTINUING EDUCATION
ROCHESTER INSTITUTE OF TECHNOLOGY

Few college degree programs have provided students with preparation for the realities of the workplace. In order to provide an orientation to the world of work, institutions of higher education have begun to introduce experiential components to their programs. Students, employers and educators recognize the value of these experiences. However, many still struggle with questions of quality, pay, and administration.

Rochester Institute of Technology was one of the first schools in the country to offer and has become a model in the development of co-op programs. RIT students work for a "block" of time (one or two quarters) full-time and for pay. They apply for their positions and function on the job as full-time employees. When the co-op goes well they are often invited, upon graduation, to return to the company as permanent employees. They do not earn credit for this experience, however, and many co-op degrees take five years to complete.

Some institutions, especially those with teacher training and liberal arts programs, arrange internships for their students. In this configuration students also work full-time for several weeks or a term. They earn credit for which they pay tuition and receive a grade, but they are not paid for their contributions to employers.

Internships tend to place students in educational institutions or service agencies with tight operational budgets while co-ops tend to occur in business and industry where budgets encourage hiring novice professionals at minimal wages.

Institutions hoping to develop experiential components to technical communication programs must make a decision whether to establish a co-op (paid without credit) or an internship (unpaid with credit). A new program, designed cooperatively between the Rochester chapter of the Society for Technical Communication and the Rochester Area Colleges Consortium of Writing Directors, offers a solution to this dilemna. We have designed a program which incorporates the advantages of both.

Through the cooperation of colleges and employers interested in recruiting young professionals into their companies, students can apply for and earn both a salary and credit for their co-op. The Co-op Program guidelines state:

> "The program provides an opportunity for qualified students in communication-related disciplines to integrate work experience with classroom theory in a professional setting. The program is also an excellent way for employers to find qualified communicators at minimal search cost and minimum risk."

This program was designed to give students the experience they can expect when, upon graduation, they undertake an actual job search.

For others interested in developing such a program, this paper will present a review of the process which led to this unique venture and will share the procedures and materials developed to facilitate the program.

Background

Ed Taylor, President of the Rochester Chapter of STC in 1982-83, provided the initiative for the co-op project. Recognizing a shortage of qualified applicants for entry level technical communication jobs, he identified the writing programs at local institutions as a potential source of talent. Ed approached the RAC Consortium of Writing Directors in the spring of 1983. The Writing Directors enthusiastically received his idea.

The Rochester Area College Writing Directors is a consortium of representatives from regional colleges. Its intention is to foster communication and to share resources across institutions. The group meets formally twice a year though the primary purpose is the informal interactions which result. Members share resources, foster creativity, encourage innovation, and stimulate healthy competition.

Nazareth College of Rochester has, for the past four years, offered a professional writing concentration as part of its English department--a familiar phenomenon with familiar results for CPTSC members. Alex Sutherland, Director of Nazareth's writing program and an inexhaustible advocate for his students was particularly enthusiastic about the suggestion of a co-op program and provided much of the momentum behind the project.

In June, 1983 Ed Taylor turned his STC Presidency over to Bruno Petrauskas. Fortunately, Bruno was as committed to the concept of his predecessor. Over the summer, Bruno, Alex, Ed and several representatives from interested area colleges developed the concept (including procedures) and designed forms to facilitate the process.

In developing procedures and forms, the group identified several imperatives:

- the procedure should replicate that which the student would experience in searching for a professional position.
- institutional credit should be evaluated by a faculty sponsor from the respective school.
- part of the input for the evaluation should be a performance appraisal done by the supervising employer.
- the position should be comprised of professional level tasks to ensure the student's learning useful skills.
- the financial compensation should be at least the national minimum wage.
- the employer should be free to terminate the employment should that become necessary due to a student's unacceptable performance.
- the employer should be aware that termination would result in the loss of credit for the student.

During the summer months area faculty and STC members wrote and revised, and revised, and revised--the epitome of professional communication. In September, 1983 the Executive Committee of the Rochester Chapter of STC approved the program. At the time we had three students waiting to apply for paid co-ops.

During the January, 1983 meeting of the STC Chapter, two students were presented certificates of completion for the program. We currently have requests from two employers for student interns.

Benefits of the Program

The original intention of the co-op was to match young people preparing for a profession in techincal communication with potential employers. In doing so, students could learn what to expect from the profession; employers could test the potential of the individual. Specific benefits identified were:

- To the employer:
    - * qualified communicators
    - * reasonable compensation costs
    - * lowered recruitment costs
    - * reduced search time
    - * low-risk employment period
    - * opportunity to evaluate employee suitability
    - * students knowledgeable about employer's product/service
    - * useful temporary employee
- To the student:
    - * hands-on experience in the area of study
    - * work in a professional setting
    - * school credit
    - * compensation from the employer
    - * reference for future employment
    - * experience in job application procedures
    - * refinement of career goals
- To the college:
    - * recognition for excellence in education
    - * cooperative relationships with community employers
    - * recognition for specific programs and instructors
    - * potential for recruiting more and better students

The Roles of the Institutions and STC.

The local chapter of STC has, from the beginning, taken the initiative in this project. They have, also, from the beginning made clear that their role, once the project moves beyond the organizational stages, will be that of liaison. We hope, in this way, to establish a competitive environment for the co-ops. The employer will post the co-op with STC by submitting a job description. The STC will then disseminate the information to faculty sponsors within local colleges.

Faculty sponsors will be responsible for notifying eligible students who may then apply for open co-ops. This role can be assumed by a faculty member, advisor, or administrator. As part of the application procedure the recommendation of the faculty sponsor will serve to influence but not to appoint; he or she might recommend more than one student for any position--a predicament encountered by any referencer. After a student's appointment, the sponsor will define a learning contract with the student (see Figure 1) and then will continue as a mentor to the student throughout the co-op placement. At the end of the period, the sponsor will review the contract with the student, consider the employer's appraisal and evaluate the learning based upon:

- fulfillment of learning objectives identified in the learning contract
- employer's performance evaluation
- the student's accounting of the learning experience

This person, then, is responsible for the granting of credit to the student.

When a manager or supervisor identifies a need in his group that might be met by an apprentice writer, he or she may submit a job notice (See Figure 2) to the Education Committee of the STC for distribution. As an employer of an intern, that person will review resumes and interview candidates just as for a permanent position. When an intern candidate is hired, however, the employer not only takes responsibility for supervision, but for teaching the skills identified in the job description. At the end of the co-op, the employer will be asked to provide a performance appraisal similar to that for any employee. (See Figure 3) The responsibility of the employer will be to provide an experience for the student which will teach what that company expects of a technical communicator and then to evaluate performance on the job.

The student will learn, through this program, specific skills associated with one technical communications situation. That student will also learn the standards of performance associated with the profession in general. His or her responsibility will be to:

- apply for available positions by submitting an application letter and resume
- secure a reference from the faculty sponsor
- interview for positions
- define a learning contract when appointed to a co-op
- fulfill the terms of the position

- fulfill the learning contract
- provide a learning evaluation to the faculty sponsor
- enjoy the experience and certificate of completion

The program is designed to simulate the job search, application, and early period of an entry level position. For learning in the work environment the student can earn credits toward a degree according to the approximate formula: 35 work hours = 1 semester credit. In addition, a student might with a little luck and hard work take away from the co-op an invitation to apply for a permanent position after graduation. It is clear that this program was designed by practicing technical communicators as well as educators--working together to offer students an educational experience which will truly prepare them for work.

TELEVISED TECHNICAL WRITING: TEACHING ON NETWORK NORTHEASTERN UNIVERSITY

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NORTHEASTERN UNIVERSITY

In Fall 1983, I was offered the opportunity to teach graduate technical writing on Network Northeastern, a closed-circuit television network, broadcast to some 12 Boston area industries. Before I accepted the offer, I worried over how a part of my teaching theory would work on TV. This theoretical part is that an inherent part of teaching technical writing is in-class editing and peer critique of student writing samples, and that teaching writing necessitates close interaction with one's students.

As I accepted the offer, I remembered a televised junior-high school class on the History of Wisconsin, during which I was bored to death. Even watching television during school hours was no relief to the insistent drone of a teacher listing Indian tribes and ethnic settlement groups. Could teaching technical writing on television be any better? I determined to find out.

This paper explains the Network set-up, presents the process of a televised writing class, and explores the advantages and disadvantages of such a class, including making brief recommendations to improve classes. In a word, it attempts to answer the question: "Can you teach technical writing to people you can't see?"

The ITFS Set-Up

Network Northeastern was established by the University and the College of Engineering in September 1983, at an initial cost of $750,000. Classrooms on Northeastern's Boston campus were converted to studios. Signals are transmitted from the classroom building, Robinson Hall, to an omnidirectional antenna on top of the Prudential Tower, the tallest building in downtown Boston. The signal is relayed to industry sites up to 50 miles away. These sites have classrooms with television monitors and dedicated telephone lines, allowing calls back to the classroom. (See Figure 1.)

Course Design

The initial plan was to bring graduate level engineering instruction to practicing engineers in high technology companies. The theory was that companies would prefer to let employees take classes on-site, over a televised network, than to let them take time off work to go to one of Northeastern's campuses. In January, a series of undergraduate classes was added at night, for practicing engineers or engineering technologists who had never obtained a degree. Thus, with an emphasis on engineering students, the course was designed to be "Writing for Technical Professionals," aimed at working engineers who wanted to improve their writing skills.

Unfortunately, the Engineering College would not give its graduate students degree credits for this course. And, while engineers know that they are doing more writing than they expected, and know that their skills need improving, they seldom will elect to take a writing course to improve those skills. This is especially true when the college determines that engineers can take these courses, but will receive no credit toward a degree. Thus, enrollment was not high. (Those students who did enroll went on to co-op or permanent jobs as technical writers.)

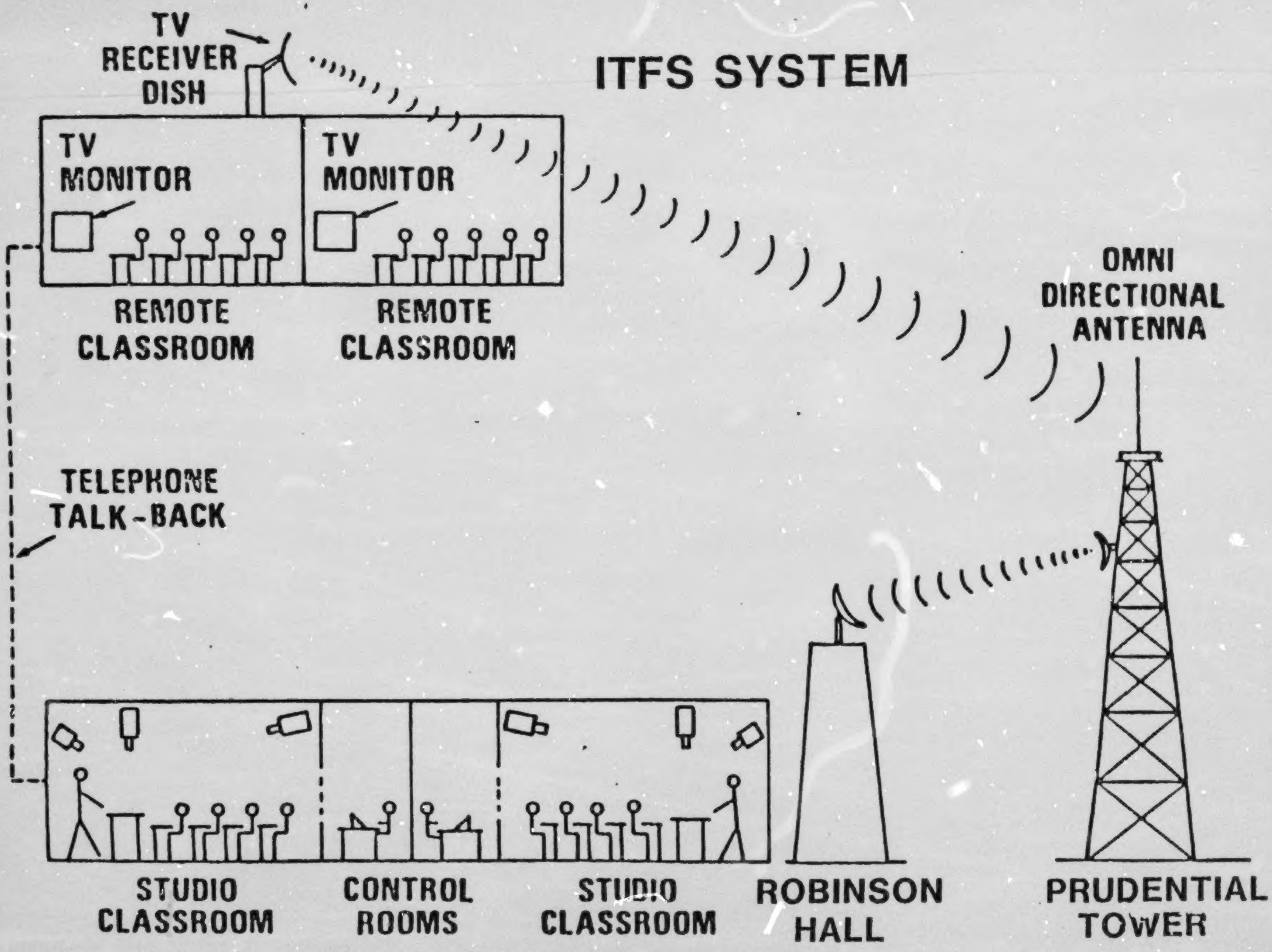
ITFS SYSTEM
TV RECEIVER DISH
TV MONITOR
TV MONITOR
REMOTE CLASSROOM
REMOTE CLASSROOM
OMNI DIRECTIONAL ANTENNA
TELEPHONE TALK-BACK
STUDIO CLASSROOM
CONTROL ROOMS
STUDIO CLASSROOM
ROBINSON HALL
PRUDENTIAL TOWER

Figure 1. The ITFS System.

The Classroom

The Network Northeastern classrooms were converted into television studios. The rooms have fixed seats, are carpeted and sound-proofed, with excellent acoustics--a conversational voice will easily carry to the back of the room. (Figure 2 is a diagram of the classroom.)

Two cameras are recessed into the back wall, allowing straight-on and angle shots (A). An overhead camera with a zoom lens focuses on the desk in front of the instructor, allowing close-ups of written or other visual materials, and allowing the TV screen to function as a screen would for an overhead projector or slides.

The televised image is projected in the classroom on four, color TV monitors (B), allowing students to watch both the TV screen and the instructor. There is an additional monitor hidden in the podium (C), which allows the instructor to see him- or herself, or, more important, to adjust visuals that are being picked up by the overhead camera. The instructor can ensure that a visual is centered on the screen, or is positioned so that the camera can zoom in on the words or images he or she is discussing. Finally, there is a bank of monitors in the control room which allows the director to set up shots and monitor all cameras.

Audio broadcast is controlled by microphones. The instructor wears a lapel microphone, which picks up his or her voice for broadcast to the remote sites. A microphone suspended from the ceiling (D) picks up students' voices from the classroom and allows them to be broadcast. Overhead speakers (E) amplify incoming calls from students at remote sites so that the instructor and students can hear and respond to them.

At the remote sites, students are in classrooms with TV monitors. To comment or ask questions, students dial a three-digit number and are

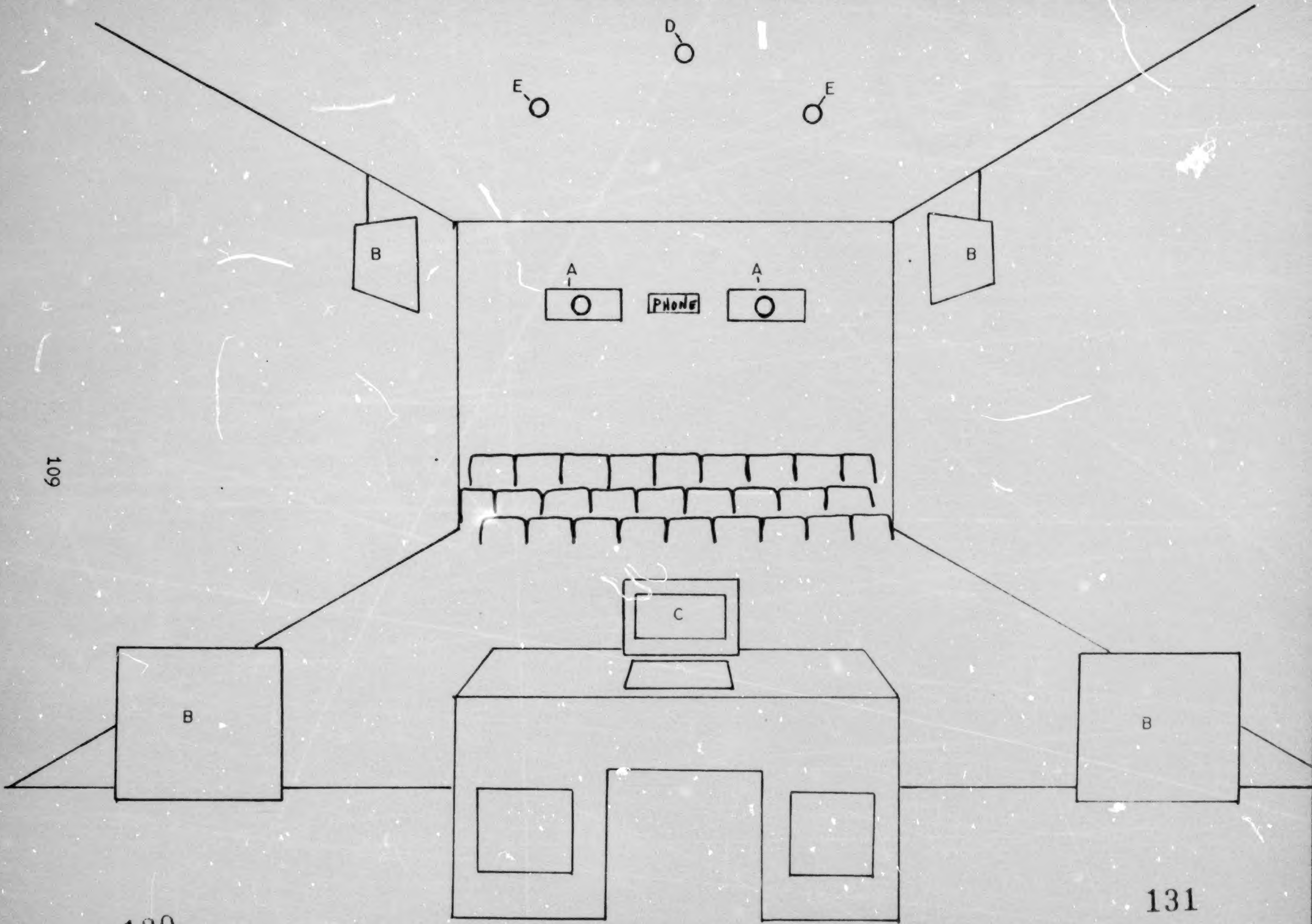
D
E
E
B
B
A
A
PHONE
C
B
B

Figure 2. Network Northeastern Classroom.

connected through the control room to the classroom. Again, the series of microphones and speakers allows interaction between remote students, the instructor, and classroom students.

How a Class Proceeds

The televised hour can proceed as any lecture would, with the instructor lecturing and occasionally using the blackboard. The multiple cameras, monitors, and microphones, however, allow a much richer interaction during a technical writing class.

To get dialogue going over a piece of writing--in effect, to simulate peer editing and criticism--I place a student writing sample on the desk so that the overhead camera can zoom in on it and project it on the monitors. Often I had to retype the writing sample in 10-pitch pica, with three-inch margins to get the type large enough to allow the camera to enlarge it enough for students to read it. For example, to get a line of this paper the correct size for enlargement, the line would look like this:

> Students begin to comment on the
> sample, suggesting changes.

For even easier enlargement, the instructor can use the "Orator" element for the IBM Selectric typewriter, which produces type like this:

> OR, I WILL BEGIN TO EDIT IF NO
> STUDENT VOLUNTEERS.

And this is what goes on. Using a transparency placed over the writing sample, I can make proofreader's marks or changes to the text. The students begin to offer their own emendations and comments. At this time, the remote students may call in with questions. (They are particularly likely to call in if it is their writing sample.) The director can manipulate the overhead and rear cameras, showing the writing sample with marking pen making changes and the instructor's face superimposed on the screen. The face can be a vertical or horizontal portion of the screen, or a small rectangle, or a "talking head"--the face in a small circle, perhaps two inches in diameter.

The audio portion of this segment will resemble peer edit, with a remote voice coming in over the speakers, my response to his or her questions, and the voices of the classroom students responding to us, or commenting on the text.

Guidelines for Teaching on Camera

Out of the previous paragraphs, some guidelines emerge for teaching on television. First, it is critical to have texts typed so that students can read them on the TV monitors. This often means that you must retype the text. Second, the class must be paced fairly slowly because most remote students will not call in, and they are relying solely on what they see on TV to get the point.

Third, you should take advantage of the overhead camera for dynamic visual effects because they are possible with this media as no other. For example, when we were discussing technical description accompanied by drawings and exploded diagrams, I brought in a Black and Dekker electric drill, placed it on the desk, and had the director zoom in on it to identify component parts. I then moved to a drawing and an exploded view of the drill, comparing the technical art with the "real thing." This sort of presentation enlivens the class, and makes textbook guidelines and assignments more meaningful.

A fourth guideline is to make sure that each hour has a coherent, tight structure. Television is not a forgiving media for an unprepared instructor--one shuffling through notes, writing on and erasing a blackboard, or muttering under his or her breath. Each class is a presentation, and deserves the coherence a professional would give to a business presentation.

Finally, use your own teaching or presentation style. The camera picks up artifice and an attempt to be a TV personality. The net effect of an attempt to change one's personality for the camera is pretty foolish. Candor, directness, and interest are the most successful attributes.

Advantages to Doing a Televised Class

There are numerous advantages. Some pertain to the students. Most important to University administration, television brings the University to students who would not otherwise enroll because of job commitments. This, of course, brings in additional revenues. More important for the instructor, however, the dynamics of the television media, coupled with the instructor's efforts, engage the students in the class. They are fascinated by seeing their writing on the TV screen, interested in commenting on it, and eager to improve their writing samples.

For the instructor, perhaps the two greatest advantages are (1) that it forces organization and tightness to the class, and forces (or at least encourages) the instructor to make each lecture coherent and interesting, and (2) that it allows a texture and richness not available with any other media. As the previous section mentions, the instructor can include visuals ranging from four-color graphics from publications like Scientific American or High Technology to electric drills. The media allows some spontaneity, because the instructor can share a visual with a class without having to make either multiple copies or transparencies of it. A third advantage is that the media allows the texture described above, with split screens and voice-overs.

Another significant advantage to my television experience was my very skillful director. By manipulating cameras, a director can make even dull days (the explanation of an assignment, for example) look visually interesting. The director can anticipate physical movements and control the cameras, so that he or she does not show the back of your head when you bend over the desk, or show you retrieving a pencil from the floor, or searching for a lost paper. In general, a good director puts the instructor at ease, and helps make the hour appear professional.

Disadvantages

There are few disadvantages to a televised class, but they are significant. First, it is hard to hang onto writing students at remote sites. You simply do not know if they're attending class unless they call in, and most are afraid to do so. Second, there is a sort of horror in sending back mutilated writing assignments, filled with proofreader's marks and comments, when you can't see the students to talk to them about your comments. And, it inevitably takes longer to correct these assignments because your comments and corrections must be explicit, articulate, and not devastating. I often found myself writing two- or three-page letters to accompany the returned assignments.

Second, Network Northeastern distributed handouts and delivered assignments by means of a courier van. With this arrangement, you are at the mercy of the van to get handouts to the students on time. And, you have no control over in-house mail or on-campus mail. Thus, the time delay between preparing an assignment sheet, the student receiving it, and your receiving the assignment may be two weeks longer than it would be for in-class students.

The last disadvantage is that without a great deal of extra preparation time and a skilled director, the class could be very boring. Someone who stood perfectly still and lectured, or spent the entire hour writing on the board could put remote students to sleep, or drive them into a frenzy trying to read the scrawl on the board. An unimaginative director could simply show one shot all hour, also lulling remote students into a stupor. And there is no guarantee that one's director will be expert.

Recommendations

Doing the Network Northeastern class taught me a great deal about the potential for using television in teaching technical writing. I would highly recommend teaching such a course.

I have two recommendations:

1) try to ensure that the course is given degree credits, and
2) meet all your students.

When the course is repeated, I will try to have all students come to the classroom for the first and last days, and perhaps during mid-quarter. Teaching writing, after all, is a personal venture, and nothing--not even electric drills and talking heads--can replace knowing your students.

REQUIRED: THREE HOURS OF TECH. WRIT.
UR-PROGRAM AND STEPCHILD OF TECHNICAL COMMUNICATIONS

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THE UNIVERSITY OF NEBRASKA

My topic is the required three-hour undergraduate course in technical communications. This course serves students majoring in engineering, agriculture, science, and some pre-professional colleges as the only education they will receive in technical communications. I wish to address two issues. The first is whether the Council takes any position on the appropriate design and content of this course and its place, if any, in the program for technical and scientific communications. The second is the issue of what constitutes appropriate pedagogical and theoretical theory for the design of the required three-hour course in technical communications. The two issues are related, for many "programs" may well contain only the introductory required technical communication course.

Many such courses are taught at two-year and four-year colleges and universities. Texas A&M has "more than 50 sections. . .taught in one semester."[1] Nebraska has more than 17. Oklahoma has at least 10 introductory sections and 15 intermediate sections a semester.[2] Syracuse apparently has both a beginning course for training teachers and special sections for ESL students and for "adult working students."[3] Many other schools offer several sections of the required technical communications course at the undergraduate level. And the number of such courses continues to increase. In 1981, Pearsall notes that "the demand for technical writing courses similar to the ones we currently teach will accelerate."[4] Whatever the number, this service course educates thousands of students yearly.

Does the Council take any position on the role of this course in the education of the undergraduate engineering and science major? Does it care to play any role in advising or recommending content for this three-hour service course in technical communications?

Is there any uniformity in course content? Should there be? Are most sections heterogeneous? What does the Council know about the three-hour service course? What synthesis of pedagogical and theoretical theory is appropriate in determining course content and design? Is there reason to believe the product of this course, the engineer, may need to work with the product of the programs in scientific and technical communications, the communications expert? I raise these questions for the Council's consideration. And I wish to suggest that a synthesis of theories may help determine acceptable course content for a course which serves the extraordinary role of simultaneously introducing students to technical communications while serving many students as their sole education in technical communications.

In 1979, the Document Design Center (with which many members of the Council are quite familiar) stated that one of its goals was the "development of an undergraduate level course in which students can learn the skills needed to develop and write a clear, direct, and well-organized document."[5] An ambitious goal and a most efficient course, indeed. They also queried: "Can the writing process be taught; or is writing an art learned only through mimicry, experience, and correction of finished products?"[6] Their potential course and their question about pedagogy raise important issues for the undergraduate service course. We need to consider what it is we expect the student who has had three hours of technical communications to be able to know and do. The current concern about teaching process has bearing on what the students can be expected to know about technical communications. While it is true that we have "both the need and the opportunity for development of the theoretical subdiscipline,"[7] we still have the practical issues to face. One such issue is appropriate content for the required course in technical communications. Theoretical issues about process abound in the literature on composition. But we have inexperienced teachers facing the classroom, and students who need education in technical communications. Teachers may need help in determining appropriate course deisgn. Some of that help may come from research in other disciplines, although it must be used with great care as Sommers has pointed out:

> Researchers have sought to give currency to a discipline without its own theoretical base by grasping onto whatever is culturally or intellectually in vogue. . . . These numerous and sometimes conflicting methodological studies have blurred important distinctions between the teaching of writing and the learning of how to write. We don't really know how a student develops confidence in composing. . . .[8]

Wary on all sides we must choose. Will we teach process, or product, descriptively or prescriptively? I plan to enlist the help of cognitive psychology to show how it is possible for us to teach first rather than last what I consider to be a significant part of the content of technical communications: the technical report. I believe cognitive psychology can support our tradition of teaching the report and help us refute those accusations which assert that if students are given reports as models, they merely imitate, but do not learn to write.

We have a tradition. We have reports written for purposes to audiences. Whether we classify reports as transactional reports or as genres may never be settled, although C. H. Knoblauch writes convincingly of the "distinction of generic and operational prescriptions of intentionality."[9] These distinctions and his argument are appropriate only to substantiate the concept that our students need to learn about audience and purpose. Unlike composition teachers who may even say in textbooks that "you will probably do more writing per week during your years in college than you will ever do again in your life. . .,"[10] we know our students will write on-the-job. As one textbook author indicates, topic discovery is not a problem for the professionals: "Professionals almost never mention topic selection"[11] as a problem. Another text says, "As technical writing fulfills a special purpose, invention does not enter into the writing process for the E/T [Engineer/Technician] as it does for the creative writer."[12] Some composition texts talk about invention or discovery as methods for finding something to say. But we know that our students not only will have something to say, but will have to say something in a form other than the essay or personal journal. In the classroom we have to help our students discover topics, learn what technical reports are and begin to learn how to write those reports. Reports will help students generate topics.

Reports serve several purposes. The report gives students knowledge of the kind of writing they may expect, gives them a gestalt, an image, a sense of what the report "looks like." But more than mere model, it is part of an entire communication process, and it functions as a heuristic for developing information. The report also functions as a source for in-class analysis and discussion of rhetorical and situational aspects of writing. Students need to become aware of the complexities and constraints of writing, as summarized by Frederiksen and Dominic:

> To reflect the kinds of interdependencies possible among [the psychological aspects of writing], we think it important to view the four perspectives--cognitive, linguistic, communicative, and contextual--as emphasizing different kinds of influences or constraints on writing processes.[13]

These interdependencies are reflected in the professional technical report, itself the product of a communication process. The report provides the student with examples of reader-based prose, prose which serves an audience and a purpose, has an intention, reflects necessary rhetorical constraints, is developed with its own coherence, and which, though it does not reflect their own cognitive activities, will influence the knowledge they bring to their own experience of writing a similar report. None of these ideas about interactive aspects of writing are new to us. They have always been contained in the report as genre, type or text. It is essential that students become aware of the variety of constraints in writing. Students can learn about these constraints and their interdependencies by studying the professional report as well as by writing their own reports.

If we teach the report, are we teaching mimicry? The actual process of teaching mimicry would be difficult to identify. If mimicry can actually be identified and observed, it is possible that teaching only mimicry may have had its origin in classical rhetoric. Kinneavy notes that in the twenties and thirties English Departments changed:

> speech "took rhetoric.". . .logic also departed. . . .Original and creative narratives and descriptions, in which the student above all expressed himself, made up a large part of the composition work. . . . In another curious combination, these kinds of composition were often taught by means of imitation of models (a continuing heritage of the formulary rhetoric of Isocrates).[14]

Perhaps, but do reports serve merely as models for imitation? In technical writing, reports serve as genres, as models. Because reports are models does not make our use of them prescriptive nor students' use of them mimicry. In fact, our tradition is a tradition based on report writing. Mills and Walters state that they collected samples of reports as one strategy for developing their first edition.[15] The report form implied a certain discipline: a set of formal and situational constraints. "Discipline" conveys more than one meaning certainly; an essential meaning is that meaning and form are interrelated and that different kinds of reports serve different purposes and audiences. Discipline is an essential word in technical communications. Mitchell stated in 1976 that a certain discipline was necessary:

> this group wants to ride in harness, for they know their communication must be consonant with a machinery. They demand a "this-is-the-way-it's-going-to-be" classroom approach. They want to be indoctrinated--as opposed to educated--in what is expected of them.[16]

Mitchell is a pragmatist; technical communications is practical, and reports have constraints. This position was somewhat whimsically treated by Sides in 1981 when he raised a rather Quixotean question:

> Is the influx of heuristics an enrichment of our discipline or a perversion of it? . . . .the use of heuristics in technical writing teaching is clear: as prewriting, discovery and invention procedures, as provisions for solving communication problems. . . .We can indoctrinate and educate as long as we give the best of both--prescription and heuristics.[17]

In 1983, Winkler resolved the apparent conflict between prescription and heuristics. She identified the report as both an inventional and a structural model:

> Inventional models are creative analogies that guide the writer's cognitive processes in generating the subject of the discourse. . . . Structural models assist the writer in giving form to that substance. The inventional model describes a way in which the mind orders experience; it can, therefore, be used as an imported analogue in an analogical act, whose purpose is to order a problematic realm of experience, the topic analogue. Used in this way, it enables writers to generate the substance of discourse. The structural model provides rhetorical form. . . .[18]

This position and the evolving tradition of using reports as models in technical communications was supported by Beugrande when he noted that the text itself is far from a static model:

> . . .we must discard the old notion of text as a static artifact on the page before us. What we have is in reality a chronicle of decision in which a significant role was played by a vast amount of material not on the page. . .a text and its revision are documents of decision processes controlled by the writer's outlook on information priorities.[19]

The positions of these four theorists, Mitchell, Sides, Winkler and Beaugrande, support the use of the report as source of information about the communication process and about the cognitive, linguistic, communicative and contextual perspectives which the student needs to learn to identify and to begin to manipulate. The report provides the gestalt, the schema, the knowledge of what is expected as well. The report also acts as a heuristic and "a chronicle of a series of decisions." The report permits that rather old-fashioned analysis of parts, relationship of parts, and identification of rhetorical modes of development. Not static, the report cannot be imitated. As a genre, it communicates to the student about audience, purpose, intention, structure and appropriate topic. The report also is a basic and important component of the knowledge students must learn in their study of the subject of technical communications.

However, must we do something more than present a variety of reports so that the students can learn about the constraints of the feasibility report as compared to, say, the technical brief? Must we and can we teach process? Can we help our inexperienced writers become experienced writers? Can we teach poor writers to be better? These questions have no easy answers, but one system of study from cognitive psychology offers some potentially useful information which may help theorists begin to develop answers. Protocol analyses, adapted from psychology, are designed to identify the writing process. While their findings are far from complete, protocol analyses reveal concepts about writing that I believe support the use of reports both as inventional and structural models and as the major component of course content.

Flower and Hayes observed that

> one of the hallmarks of the good writers was the time they spent thinking about how they wanted to affect the reader. They were clearly representing their

> rhetorical problem as a complex speech act. The poor writers, by contrast, often seem tied to their topic.[20]

Better writers, Flower and Hayes found, had greater ability to call upon "formal or conventional features of the text" while poorer writers developed about "70 percent of their ideas about the topic alone without concern for the larger rhetorical problem." Their tentative conclusions support the use of genres or report in the beginning class:

> We think that much of the information people have about theoretical problems exists in the form of stored problem representations. Writers no doubt have many such representations for familiar or conventional problems. . . .Experienced writers are likely to have stored representations of even quite complex rhetorical problems. . . .[21]

This "stored representation" is similar to the schema, the "prior knowledge. . .which makes. . .new information more meaningful and easier to absorb."[22] Our beginning students need to see reader-based reports which help them develop the "stored representation" or the "schema" from which they can begin to develop their own reports. They will be limited if they are not given this repertoire of genres and types, just as they will be limited if they are not taught the constraints of writing. But we can begin to see that some of their limitations in production are linked to their inexperience, not necessarily to our teaching method. Flower and Hayes note that a knowledge of goals is essential. Goals are partly dictated by the kind of report. A proposal has a different goal than the status report does. But the image or goal is important. Again, Flower and Hayes hypothesize about the differences between the poor and the good writer:

> Our guess is that the poor writers we studied possess verbal and rhetorical skills which they fail to use because of their underdeveloped image of their rhetorical problem. Because they narrowed a rhetorical problem to a paper-writing problem, their representation of the problem doesn't call on abilities they may well possess.[23]

It is true that we cannot know what abilities a particular writer possesses in a particular circumstance. But our students, used to writing papers for the teacher, need to be moved out of that mode of thinking, need to see reader-based reports, and need to try to discover the communication process, and to write reports as if the reports actually impinged on someone, as if the report had an actual rhetorical problem to solve through appropriate use or manipulation of the variety of constraints characteristic of report writing.

In support of the explanations Flower and Hayes give is the study done by Atlas. Limited though the study is, it implies that the failure of our beginning student to write "well" may be attributed to lack of experience:

> . . .novice writers are not really insensitive to their audiences. Experiment 2 [he conducted two experiments, both involving providing information in answer to questions about public transportation] shows that they are often well aware of the issues--but they are context dependent, relying on the most salient cues to tell them what points to address. . . .[24]

I am aware that I have selected this information, but it seems to me to support the idea that students may not produce superior texts partially because they are novice, not experienced, writers. A study by Selzer supports this inference.

Selzer's protocol analysis of the writing behavior of an engineer experienced in writing demonstrated that this experienced writer could manipulate reports he had already written for greater efficiency in producing the required document:

> . . .he nearly always writes in response to a specific request (e.g., a client's request for a proposal, requirements for progress reports and final reports) and since he writes certain kinds of documents again and again, his consideration of purpose has become ingrained, almost second nature. . . .Further, Nelson [the engineer] jogs his memory by reviewing previously completed documents. . . .Nelson often borrows from past documents.[25]

What I believe these protocol analyses offer is not so much a recommendation for teaching methods as a diagnosis of the ailment of the novice writer. We can all recall examples of mature students who produced fine reports while the novice student seems limited. We cannot teach maturity by process or prescription. But we can teach report types and writing constraints.

If we teach the repertoire of types the student may have to write, we provide knowledge. Unless we provide that knowledge, we may have students proficient at process, able to produce definitions, but with no knowledge of the goal of that process, or of where in a report a definition might fit. Perhaps I exaggerate, but let me note that the model may not account for the failure of the writer. And the teacher may not be the cause of the failure. Failure may not even be the problem. Models are seldom one-dimensional. Cognitive psychologists warn that ". . .all representations and models fail at some point--another lesson problem-solvers must learn."[26] However, even if the model fails to correspond exactly to the problem the student faces, the model is there as a source of inventional or structural information. And the report is the topic of technical communications inasmuch as the kind of writing the student will have to do is found often in report. The report functions as a heuristic for the student, and as source of analysis of the communication process, writing constraints, and all the seemingly traditional methods of development which are always included in all writing books. These modes or methods of development should grow out of the reports. My students have neither the experience nor the knowledge to solve the problems introduced through case studies. And case studies cannot imitate the real world any more than the report can. Neither the case study nor the report provides an audience upon which the document impinges. Thus the classroom as model fails from the beginning. But rather than concentrate on process to the exclusion of form, I believe we need to concentrate on the genre as knowledge. Students must learn about reports, about reader-based reports, and must develop knowledge before they can begin to manipulate and generate material with much ease.

Concepts from cognitive psychology can support teaching reports as models, but we can also find support in the precepts of discourse analysis:

> The writer's knowledge of the topic is a clear prerequisite for coherence in the written discourse, and increased topic knowledge has clear implications for all other discourses. . . .Related to topic knowledge is the writer's knowledge of the text form (e.g., expository or narrative form), and the kind of information to include in each. . . .The effects of knowledge of topic and knowledge of form are probably rather subtle. . . .[27]

Yes, I believe that the cognitive interactions are subtle, difficult to know and not knowable in the way we would like to identify knowledge as knowledge. But students need to have knowledge about topic and knowledge about text form as well as knowledge about genre or report type. And the text they can learn about is the report. Experience is important; so is accretion of knowledge:

> Mental representation of text may vary from vague and fragmentary to sharply delineated and detailed. Completeness of the representation will depend on a number of factors including (a) the level of sophistication of the writer, especially as sophistication entails having a repertoire of general plans or genre schemes [depends on Bereiter; see my footnote number 28] to structure text representations; (b) how frequently the writer has previously reconstructed this representation, assuming that representations will get increasingly rich as they are repeatedly reconstructed; and (c) the needs of the moment.[28]

This comment reinforces what the discourse analyses reveal. One major difference between good and poor writers is the ability to identify and make use of the larger rhetorical problem, to manipulate forms for purpose. The report has organic unity (as R. S. Crane said many years ago), and generates information for student to learn and teacher to teach. I recommend that we teach the report, without apology, to the student new to technical communications, for the report is an efficient way to move the student out of the essay mode of thinking into the subject of technical communications: presenting technical and scientific information to an audience for a purpose.

I believe that research, tentative though some of the findings are, supports a pedagogical theory which informs the design and content of a beginning course. I don't pretend to solve the conflict between product and process,[29] and I don't know whether process can be taught, whether it is discrete or recursive, or whether teaching process will make of poor writers the good experienced writers we would like to have. I really don't believe all theoretical disputes get settled, but while the feathers try to settle, some good ideas may reveal themselves. And I believe that one resolution of the conflict between teaching mimicry or process, teaching report or generation of topic, is teaching the report as heuristic and as structural model.

However, I return to the question of the Council's position in relationship to this introductory technical communications course. What does the Council think ought to be done with this introductory required course in technical communications, the stepchild of the program? Once us-program, it seems now to be a visiting cousin from the south, apparently visiting, but now here to stay. Is the course entirely separate from the programs or can knowledge developed from program design help us design an introductory course which serves students efficiently and reasonably soundly? Does the Council care to take a position on the content of the course or on the place of the course in the program? Or is raising questions about the content of a course or the place of a course in a technical communications program raising questions which are outside the purview of the Council? Does the Council recommend, or accreditate, or is it a collection of experienced scholars and teachers whose role is primarily to inform and to advise when invited?

FOOTNOTES

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2. Thomas L. Warren, "The Technical Writing Program at Oklahoma State University: Changes and Modifications." 1983 Proceedings of the Council for Programs in Technical and Scientific Communication, pp. 2-9. p. 3-4.

3. Carol Lipson, "Books, Books, Everywhere, and Nary A Drop To Be Found," 1982 Proceedings of the Council for Programs in Technical and Scientific Communication, pp. 2-13. pp. 3, 6.

4. Thomas E. Pearsall, "The State of Technical Writing." Paper presented at the Annual Meeting of the Midwest Conference on English in the Two-Year College, February 19-21, 1981. ED 199 763, p. 5.

5. Janice C. Redish and Kathryn Racette, "Teaching College Students How To Write: Training Opportunities for Document Designers." Document Design Project, November 1979, ED 192333, p. 1.

6. Redish and Racette, p. 4.

7. Paul V. Anderson, R. John Brockmann, and Carolyn R. Miller, "Introduction," New Essays in Technical and Scientific Communication: Research, Theory, Practice. Farmingdale, New York: Baywood Publishing Company, 1983, p. 9. See also Robert J. Connors, "The Rise of Technical Writing Instruction in America," Journal of Technical Writing and Communication. Vol. 12, No. 4, 1982, pp. 329-352.

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9. C. H. Knoblauch, "Intentionality in the Writing Process: A Case Study," College Composition and Communication, May, 1980, Vol. XXXI, pp. 153-159. p. 155.

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15. Gordon H. Mills and John A. Walters, Preface to First Edition, 1956, Technical Writing. Fourth Edition. New York: Holt, Rinehart and Winston, 1978. p. vi.

16. John H. Mitchell, "It's a Craft Course: Indoctrinate, Don't Educate," The Technical Writing Teacher, 1976, Vol. 4, No. 1, pp. 2-6. p. 4.

17. Charles R. Sides, "Heuristics or Prescription: Synthesis Rather than Choice," Journal of Technical Writing and Communication. Vol. 11, No. 2, 1981. pp. 115-120. p. 116.

18. Victoria Winkler, "The Role of Models in Technical and Scientific Writing," New Essays in Technical and Scientific Communication: Research, Theory, Practice, edited by Paul V. Anderson, R. John Brockmann, and Carolyn R. Miller. Farmingdale, New York: Baywood Publishing Company, 1983. pp. 111-122. p. 120.

19. Robert de Beaugrande, "Moving from Product Toward Process," College Composition and Communication, December 1979, Vol. XXX, No. 4, pp. 357-363. p. 363.

20. Linda Flower and John R. Hayes, "The Cognition of Discovery: Defining a Rhetorical Problem," College Composition and Communication, February 1980, Vol. XXXI, No. 1, pp. 21-32. p. 20.

21. Flower and Hayes, p. 30 and 25.

22. Flower and Hayes, p. 30.

23. Flower and Hayes, p. 30.

24. Marshall Atlas, "Addressing an Audience: A Study of Expert-Novice Differences in Writing," December 15, 1979, Document Design Project: Technical Report No. 3. ED 132338. p. 42.

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27. Deborah McCutchen and Charles A. Perfetti, "Coherence and Connectedness in the Development of Discourse Production," in Text: The Interdisciplinary Journal for the Study of Discourse: Special Issue: "New Developments in Cognitive Models of Discourse Processing." Special Issue edited by Teun A. Van Kijk. New York: Mouton Publisher, 1982. Vol. 2-1/3, pp. 113-130. p. 114.

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A NEW COURSE: TECHNICAL AND SCIENTIFIC LITERATURE

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How the Technical and Scientific Literature Course Fits into the Technical Writing Program at North Texas State University

The technical writing program at North Texas State University (NTSU) has grown. Three years ago during my first year at NTSU I presented to CPTSC a proposal for a minor program in technical writing at NTSU. That program passed its last university committee two years ago. In two years time, enrollment in the program has increased dramatically, from 125 students to 525 students. NTSU now offers 25 sections of four courses, up from six sections of one course in 1981.

The Minor in Technical Writing at NTSU contains four courses: Technical Writing, Advanced Technical Writing, Technical Editing, and Technical and Scientific Literature (T/S Lit). T/S Lit, the capstone course in the minor, is presently one semester long and may expand to two in the near future. Students write a technical journal article in T/S Lit, and write and edit the following documents, among others, in the remaining three courses: Technical Writing (long resume), Advanced Technical Writing (proposal and supporting documents), and Technical Editing (manuals).

The Technical and Scientific Literature Course Developed from Four Concerns

(1) Technical writers and teachers of technical writing have a poor self-image, and this should be a great concern. This poor self image derives, in part, from the fact that technical writers and teachers do not fully grasp the importance of their work. Engineers and managers fail to give them appropriate recognition in the work place, and academic departments fail to recognize the importance of the technical writing curriculum and its positive effects on students. It is no wonder that technical communicators slip into the thinking that technical writing is less important than design and that technical writing courses are less important than Chaucer and Shakespeare courses.

The T/S Lit course can demonstrate to future technical communicators that past technical and scientific writing has enlightened both expert and general audiences for the benefit of society.

(2) Technical communicators should write for the public as well as the usual work-place audiences. The mission of the technical writer is not a narrow, job-oriented one, but a broad societal one. Technical communicators need to present information in such a way that the general public will notice trends and issues and perceive the need for intelligent decision-making with regard to these issues. Philosophically, technical communicators should be committed to enlightening the usual audiences--experts, managers, technicians, clients--and the general public about science and technology. Society needs informed citizens to make intelligent decisions about new technology and our increasing dependence on it.

Opportunities to contact this public audience abound for technical writers--in operator's guides, in news releases, in technical advertising, in technical journal articles. Technical writers--and teachers of technical writing--can publish materials which assist the public in better understanding science and technology. The T/S Lit course awakens this consciousness in the fledgling technical communicator, and convinces the student of this responsibility.

(3) The criticism of the quality of technical reports, manuals, proposals, and journal articles is excessive. Technical communicators do technical and scientific literature, past and present, a disservice when they criticize, excessively and in nonconstructive ways, today's technical communications. Many of today's technical communications are meritorious to the point of deserving the label "literature," and they should be recognized as such. One tires of hearing so many blanket statements about incomprehensible technical manuals, and the like.

And departments of English need to overcome a bias toward technical and scientific literature. Some more traditional colleagues will unknowingly accuse teachers of technical writing of presenting inferior literature or "non-literature" in courses. Teachers need only list examples of the fiction and non-fiction mentioned in the "materials" section of this paper to counter those statements. The technical writing instructor can also urge, confidently, that his more traditional colleagues teach the T/S Lit course, with guidance. Hence, traditionalists can view the technical writing curriculum as an ally of the English department: technical writing develops enrollment in literature courses.

(4) Teaching any writing course can be difficult and dry. Some teachers of technical writing teach writing courses exclusively. Though, most also teach a literature section, perhaps one in a specialty. Most will also admit to avoiding "burnout" because of the literature courses. Students may feel the same way!

What is needed in technical writing curricula is a course with more emotional content. As a prelude to designing and teaching the T/S Lit course, I introduced Hemingway's The Old Man and the Sea into the NTSU beginning technical writing course. Students and I examined the physical descriptions, process descriptions, and wealth of technical detail in the novel; we discussed the rudimentary technology man employs in mastering nature. We also talked about theme and character, pathos and tragedy. I felt more comfident in proceeding with the advanced T/S Lit course after this limited trial run.

Goals for Students in the Technical and Scientific Literature Course

Instructors should set out the following goals for students at the beginning of the semester. Foremost among these goals is the need for students to begin the process of funneling all efforts and information toward the fifth goal of producing the journal article by the end of the semester:

To recognize the characteristics of an effective technical writing style.

To continue learning to evaluate literature for its effectiveness or lack of effectiveness. To study the rhetorical patterns and devices which characterize effective technical literature.

To appreciate the importance of communicating knowledge of science and technology to typical industry/business audiences and to the general public. To appreciate the importance of the decision-making process as it relates to the use of science and technology in a global society.

To appreciate the importance of the mission of the technical writer as a voice in this transference of information.

To widen students' scientific and technical vocabulary.

To learn more about the technical writing process by writing a technical article to be submitted to a journal in the student's major area.

Tasks Students Will Accomplish in the Technical and Scientific Literature Course

Instructors who teach T/S Lit can view the course as having four tracks: literature, the evaluative process, the journal article, trends/issues. Lectures and assignments will remain on track if instructors periodically check themselves to see if class discussions relate to these four lines:

Literature

Read literature related to science and technology from different periods and genres.

Create an annotated bibliography of technical and scientific literature to be updated after the student leaves the course.

Maintain a notebook throughout the course of new terms, processes, and ideas.

Translate passages meant for one audience into text which another audience can understand.

The Evaluative Process

Write short papers analyzing literature for its effectiveness.

The Journal Article

Identify regional, national, and international scientists and commentators who enhance our understanding of science and technology.

Examine journal articles in various fields and report the contents and effectiveness, or lack thereof, to other class members.

Write an eight-to-ten-page journal article in the major area, and submit article to journal/magazine.

Trends/Issues

Catalogue trends and issues related to science and technology evidenced in the literature.

Classify trends and issues according to their relation to agrarian, industrial, post-industrial/information periods.

Discuss trends and issues in national and global terms.

Materials Which Can Be Used in the Technical and Scientific Literature Course

The instructor can choose from the following list of books and journals. Currently, I am using Writing About Science, Audience Analysis for Technical Writing, and Megatrends in class, plus various handouts and library reserve assignments.

Blickle, Margaret and Passe, Martha (eds.). Readings for Technical Writers. New York: The Ronald Press Company, 1963. (out of print)

Use selections from this anthology to demonstrate characteristics of the technical writing style.

Bowen, M.E. and Mazzeo, J. (eds.). Writing About Science. New York: Oxford University Press, 1979.

Selections from Farraday to Asimov. Aimed toward popular audiences. Essays demonstrate technical and scientific writing style, and also supply details of various technical and scientific disciplines.

Hemingway, E. *The Old Man and the Sea*. New York: Charles Scribner's Sons, 1952.

Passages from the novel--especially descriptions of fish, fishing equipment, the process of hooking fish--demonstrate Hemingway's technical writing style.

Hemingway, Ernest. *The Sun Also Rises*. New York: Charles Scribner's Sons, 1926.

Excerpts from the novel, especially those demonstrating the technique of bullfighting.

Melville, Herman. *Moby Dick*. New York: Harper and Brothers, 1851.

Excerpts from the novel, especially those describing whales, whaling equipment, illustrating whaling techniques. Parts of the novel read like a technical manual on whaling.

Naisbitt, John. *Megatrends*. New York: Warner Books, Inc., 1982.

Naisbitt presents ten trends and issues embedded in those trends. Trends are derived from articles sampled from newspapers around the world.

Pearsall, Thomas. *Audience Analysis for Technical Writing*. New York: The Macmillan Company, 1969. (out of print)

Technical, scientific selections written for different audiences: expert, executive, layman, technician, operator. Discussion of characteristics of these audiences. Book out of print, but copies can be made with permission of publisher and royalty payments for each copy.

Journal of Technical Writing and Communication

Selected articles for student evaluation.

Technical Writing Teacher

Selected articles for student evaluation.

Technical Communication

Selected articles for student evaluation.

Mitcham, Carl and Mackey, Robert. Philosophy and Technology. New York: The Free Press, 1972.

Contains a history of technology from the Egyptians forward.

Webb, Suzanne S. Prose That Works. New York: Harcourt Brace Jovanovich, Inc., 1983.

More selections of technical and scientific writing, with more of a slant toward imaginative writing.

* * * * *

With regard to the promised syllabus, I will leave that to all of you. My materials and reading assignments change from one semester to the next, except for the writing of the journal article and the other tasks I mentioned. I believe that the course can be successful running on the four tracks (literature, the evaluative process, the journal article, trends and issues) using materials you feel comfortable with.

A GRADUATE SEMINAR IN THE THEORY AND PRACTICE OF TECHNICAL WRITING

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Since the theme of this year's meeting of the Council for Programs in Technical and Scientific Communication is "Establishing Practical Applications of Philosophy and Theory for Our Programs," it seems an appropriate occasion to describe a graduate seminar that I offer every other year at Penn State. Entitled "Technical Writing: Current Theory and Practice," the course investigates the theoretical bases of the field and how those bases influence the current practices of technical writers. Let me stress that what follows is a description of the course and its rationale, not an argument that other programs should adopt it. The course suits the particular needs of Penn State's graduate programs in rhetoric and technical writing, but it may well be inappropriate for other programs. Nevertheless, this description may suggest some directions to others who are contemplating graduate courses in the subject, and it may inspire readers to suggest additions, deletions, or other revisions that might be useful to me. In that spirit I offer this account of the seminar.

Let me begin by outlining some of the particular circumstances at Penn State that define the course's aims and directions. The course attracts two kinds of students. About a third of them are pursuing the Ph.D. in English with a concentration in rhetoric; they plan to teach rhetoric, composition, and perhaps technical writing at a college or university. The other two thirds are M.A. candidates who are preparing for careers as technical writers. As I reported in last year's Proceedings, Penn State does not offer an M.S. or a strictly "professional" degree, but the Master of Arts in Writing, with a concentration in technical writing. As a result, the graduate students in the program complete a course in research methods, master a foreign language, and often take courses in discourse analysis, literary theory, or literature. They also, of course, enroll in a variety of practical writing courses, including Editing, Technical Writing and Editing, and The Writing of Nonfiction; most also elect several other writing courses, such as Science Writing or Fiction Writing or Biographical writing or the like; and most complete an internship. In short, these graduate students are capable, well trained writers. Thus, we needed a course that would not only contribute something different to our Ph.D. students, but give technical writing students a theoretical perspective on their other coursework. We needed something that would round off the pragmatic character of our technical writing program, something that would not only expose students to the conventions of the technical writing world, but also enable students to understand where conventional advice comes from and what it is based on. Such theoretical knowledge, we believe, is essential for a truly professional technical writer. Writers without such knowledge tend to be "rulebound"; writers with such knowledge, in Tom Warren's words, "fight against custom" as much as they follow it. They adapt and grow on the job. They take a critical attitude to their work. They shape their profession. They contribute to professional debates. They lead the profession in new directions. This seminar, therefore, examines assumptions, calls current practice into question, and suggests alternatives. It examines current practice in technical writing and the current theories that generate such practice. It makes students more adept and more professional by forcing them to analyze technical writing critically. The course also, I admit, reflects my own biases: my theoretical biases on what is useful for advanced technical writers; my personal biases on what ought to weigh most heavily in the discipline; and my professional biases on what is educationally significant.

What does the course consist of? As you can see from the syllabus below, the course is arranged around a series of questions, most of them related to specific aspects of the writing process. The first two weeks might be considered introductory. The first week includes an introductory lecture on bibliographic resources and research opportunities in technical writing (since all students are required to complete an original research project). The second week considers the nature of technical writing. The readings survey influential early definitions of the field (most of them based on the analysis of technical discourse) and more recent formulations (most of them based on a consideration of rhetorical situation).

The next three weeks consider some contexts for the study of technical writing, some ways of approaching the subject. First the class considers "new" ways of thinking about science--new ways that contradict the positivism that dominated scientific thought until recently, new ways that acknowledge the contribution of rhetoric to science. (I have included Kuhn's The Structure of Scientific Revolutions on this syllabus, but the work of Stephen Toulmin, Robert Pirsig, or Karl Popper might work just as well.) Next we consider a related topic, the impact of the "new rhetorics" on scientific and technical writing: the assumption of the epistemic rhetoricians that rhetoric is crucial to knowledge itself; and the assumption that technical prose is best understood in terms of the conventions of the particular discourse community that calls for it. Week five might be described as "pragmatics"; there we examine particular arguments (by Gusfield, Yearley, Overington, Weimar, and Wander) that science and technology are indeed fundamentally rhetorical enterprises, and we analyze as a group the "rhetoric" of two real-world proposals. By the end of these three weeks, students who have learned that "writing is a tool" also know that it is not just a tool.

The next segment of the course considers ways to think about certain basic activities in the writing process: determining purpose, inventing, and arranging. The readings on aim are intended to counter any simple-minded approaches to purpose that students might bring to the seminar. The weeks on invention are meant to make clear that invention is indeed a part of the professional technical writer's job. Students examine the appropriateness of various general strategies that any writer might use to explore a subject, to stimulate memory and imagination, and to determine the conventions of specific genres. They are also introduced to what might be called "field-specific" invention tactics--those actions that people in particular disciplines use to find and develop information for technical documents. And they spend two weeks learning and practicing various approaches to audience analysis. Audience analysis is not relevant only to invention, I realize; it also affects the selection, arrangement, expression, and revision of information in any technical document. Nevertheless, I find it convenient and appropriate to emphasize that audience analysis is indeed an invention tactic, an activity that suggests content to a writer. The readings on arrangement in week ten are not so numerous as those in other sections of the course, probably reflecting my sense that not very much productive thinking has been done recently on the arrangement of technical discourse.

Questions about style occupy the next section of the seminar. In week eleven, the class learns about the historical roots of certain stylistic conventions, especially those associated with the "plain style" and "impersonal language," and considers whether some of those conventions might usefully be modified. In particular, the readings ask whether personal language, figurative language, and several kinds of stylistic display might not have a legitimate function in scientific and technical prose. In week twelve, students question various assumptions about readability. What are reliable guides to readability? What stylistic choices really affect readability? What are the advantages and disadvantages of striving for readability as an absolute goal? In both weeks on style, half the seminar period is devoted to practical stylistic analysis and revision of technical prose.

The final weeks of the course take up a few final questions. Is there a "rhetoric" of visuals? What are reliable and tested maxims for the development of charts and illustrations? What advice about typography and page design can technical writers depend on? That is the matter for week thirteen. In week fourteen I make a short presentation on reliable and efficient ways to evaluate the effectiveness of the things technical writers produce, and then I listen for two weeks as students report on their own research projects.

Those projects, in fact, are a most important component of the seminar. Like students in other graduate seminars in English (or any other discipline), students in English 518 are expected to carry out original research, to make their own inquiries into specific areas and features of technical discourse. That research is patterned after the research studies that students read throughout the term: some is based on theoretical studies; some is based on historical work; some is rooted in some kind of rhetorical analysis or other close observation; some is empirical; and some students combine several methods as they search for answers to their questions. Students are free to inquire into any aspect of scientific or technical prose that attracts them. In the past, some students have been interested in technical writers themselves, particularly in writers' composing processes. One considered how changes in technology affected technical writers in a particular organization; another observed how a specific writer's tactics changed as he performed several different writing tasks. Other students have been interested in audiences. One, for example, watched users wrestle with computer manuals and then, based on her observations, formulated recommendations for manual writers. Others have studied particular texts. One person catalogued the generic conventions of computer manuals, for instance. Another wondered if and how visuals could be used to enhance textual cohesion. But most of the students have examined particular controversies in the field. Do plain language guidelines really achieve their desired ends? One student did a case study to find out. Why do metaphors appear less frequently in technical writing than in science writing? A student tried to answer that question by considering recent theoretical work on metaphor done by scholars in philosophy and aesthetics. Have stylistic conventions in technical and scientific prose changed in this century? Two different students tackled that question by doing stylistic analyses of technical prose collected in our library. How do technical writers handle secret or confidential information in government research labs? Is a "computer journal" (i.e., a journal written, refereed, collected, edited, distributed, and stored solely on interactive computer disks) feasible today? Do tagmemics offer a practical way to analyze technical paragraphs? All these subjects (and a number of others) have been explored by students in the seminar. And several of the students have reported their findings at professional meetings after the course has concluded.

The research projects develop, of course, throughout the progress of the term. In the first week I suggest research possibilities, and students tentatively consider possible directions (under my supervision) in the next month or so. (Some of the readings in the first five weeks are included partly because they exemplify certain research approaches and methodologies.) By week six, students are ready to commit themselves to a project by writing a short proposal. Then, as the course readings continue, so do the students' independent inquiries; the amount of reading required each week for the seminar decreases as their projects heat up. Students report progress (in writing) in week nine, prepare rough drafts for week twelve, and submit a formal report (complete with title page and abstract) in week thirteen. After I return the reports with comments, students revise them into the format of a scholarly article and present their findings orally to the class. That way, students get practice in writing several forms and experience in remaking a document into a different medium. And that way students' finished articles have the benefit of at least two revisions. By the time the course is finished, students have had an opportunity to reflect critically on technical prose and to apply what they learn to their own writing.

And by the time the course is finished, I find that I have changed my thinking about technical writing as well. The readings and the research projects challenge everyone to reexamine assumptions, to challenge conventional wisdom and easy generalizations. As I have said, this seminar will not be appropriate for every graduate program (though Mary Coney and James Souther have mentioned that the seminar has influenced a course they plan to initiate soon at the University of Washington). But those who try to incorporate a course in "current theory and practice" into their programs will find that it produces students who are more likely to be comfortable with useful technical writing conventions since they know the grounds of those assumptions, and students who are more likely to question inherited wisdom productively since they know which grounds are shaky. They will find that their students are more thoughtful and proficient writers and more likely to contribute professionally to the field.[1]

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[1] I thank Carolyn Miller for several useful suggestions for the course and for sharing some of her work in progress with me; and I thank Paul Anderson for other suggestions and for helping to make certain materials available to my classes.

English 518: Technical Writing: Current Theory and Practice

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Purpose:

English 518 aims to make students professionals in the area of technical writing. First, it examines current practice in technical writing and, especially, the current theories that generate that practice. Second, it makes students better technical writers themselves by exposing them to current theory and practice, by forcing them to analyze technical writing critically, and by requiring them to practice writing a proposal, a progress report, a technical report, and a scholarly article.

Requirements:

1) Informed, enthusiastic reading of assignments.
2) A short proposal suggesting a research project for the term.
3) A short progress report.
4) A technical report on a substantial research project of your choice.
5) A publishable article based on the information in your report.
6) An informal oral report to the class on your research (20 minutes, plus class discussion).

Texts:

Paul Anderson, Carolyn Miller, and John Brockmann, eds., New Essays in Technical and Scientific Communication (Baywood)
Thomas Kuhn, The Structure of Scientific Revolutions (Chicago)
Richard Young, Alton Becker, and Kenneth Pike, Rhetoric: Discovery and Change (Harcourt, Brace, Jovanovich)
James Kinneavy, A Theory of Discourse (Norton)
Various readings on reserve in Pattee Library

Schedule:

Week One: Introduction
Introduction to research in technical writing.
Bibliographical resources for technical writing.

Week Two: What Is Technical Writing?
Robert Hays, "What Is Technical Writing?" (reserve)
W. Earl Britton, "What Is Technical Writing?" (reserve)
Edmund Dandridge, "Notes toward a Definition of Technical Writing." (reserve)
John Walter, "Technical Writing: Species or Genus?" (reserve)
David Dobrin, "What's Technical about Technical Writing?" in New Essays.
Elizabeth Harris, "Discourse Analysis for Technical Writing," Proceedings of the Inaugural Conference of the Maryland Writing Program. (reserve)
James Kinneavy, A Theory of Discourse, pp. 1-210.

Week Three: Some Contexts for the Study of Technical Writing
Thomas Kuhn, The Structure of Scientific Revolutions.

Week Four: Some Contexts for the Study of Technical Writing
Young, Becker, and Pike, Rhetoric: Discovery and Change, pp. 1-52.
Carolyn Miller, "A Humanistic Rationale for Technical Writing," CE, 40 (1979), 610-17.
Michael Leff, "In Search of Ariadne's Thread," Central States Speech Journal, 29 (1978), 73-91.
Charles Bazerman, "Scientific Writing As a Social Act," New Essays.
James Zappen, "A Rhetoric for Research in Sciences and Technology," in New Essays.
Vickie Winkler, "The Role of Models in Technical and Scientific Writing," in New Essays.
Jack Selzer, "The Composing Processes of an Engineer," CCC, 34 (1983), 178-87, and "Exploring Options in Composing," CCC, 35 (1984), in press.

Week Five: Some Contexts for the Study of Technical Writing
Ben F. and Marthalee Burton, "How Not to Theorize about Technical Writing," Proceedings 1982 of the CPTSC, pp. 130-40. (reserve)
Joseph Gusfield, "The Literary Rhetoric of Science," American Sociological Review, 4 (1976), 16-34. (reserve)
S. Yearley, "Textual Persuasion: The Role of Social Accounting in the Construction of Scientific Arguments," Philosophy of the Social Sciences, 11 (1981), 409-35. (reserve)
Michael Overington, "The Scientific Community As Audience," Philosophy and Rhetoric, 10 (1977), 1-29. (reserve)
Philip Wander, "The Rhetoric of Science," Western Speech Communication, 40 (1976), 226-35. (reserve)
Walter Weimar, "Science As a Rhetorical Transaction," Philosophy and Rhetoric, 10 (1977), 1-29. (reserve)
Michael Halloran, "Technical Writing and the Rhetoric of Science," Journal of Technical Writing and Communication, 8 (1978), 77-88. (reserve)
A.G. Stephenson, Proposal to NSF, "The Effects of Plant-Animal Interactions on Catalpa Speciosa." (handout)
Kenneth Nelson, Proposal to SE Michigan Transit Authority. (reserve)

Week Six: The Aims of Technical Prose
Young, Becker, and Pike, Rhetoric: Discovery and Change, p. 53-117.
J.C. Mathes and D.W. Stevenson, Designing Technical Reports, ch. 3.
Linda Flower, Problem-Solving Strategies for Writers, chapter 2.
C.H. Knoblauch, "Intentionality in the Writing Process: A Case Study," CCC, 31 (1980), 153-59. (reserve)
Carolyn Miller, "The Rhetorical Genre." (reserve)
Practicum: Stating the purpose of your research paper.
Proposal due.

Week Seven: Invention in Technical Writing
Review Kuhn.
Carolyn Miller, "Invention in Technical Writing." (reserve)
Young, Becker, Pike, Rhetoric: Discovery and Change, pp. 119-69.
Karl Wallace, "Topoi and the Problem of Invention," Quarterly

Journal of Speech, 58 (1972), 378-95. (reserve)
Lecture: Invention in technical writing.

Week Eight: Invention in Technical Writing: Thinking About Audience
Young, Becker, Pike, *Rhetoric: Discovery and Change*, pp. 171-228.
Thomas Pearsall, "The Communication Triangle," and Myron White, "The Informational Requirements of Audience," in *Teaching Technical Writing*, ed. Paul Anderson. (reserve)
Thomas Sticht, "Comprehending Reading at Work," in *Cognitive Processes in Writing*, ed. Carpenter and Just (Erlbaum, 1977), 221-46. (reserve)
Practicum: Analyzing the audience of your report, your essay, and your progress report.

Week Nine: Invention in Technical Writing: Thinking about Your Audience
Walter Ong, "The Writer's Audience Is Always a Fiction," *PMLA*, 90 (1975), 9-21.
Douglas Park, "The Meaning of Audience," *CE*, 44 (1982), 247-57.
David Carson, "Audience in Technical Writing," in *Teaching Technical Writing*, ed. Paul Anderson. (reserve)
J.C. Mathes and D.W. Stevenson, *Designing Technical Reports*, chapters 1 and 2.
Linda Flower, *Problem-Solving Strategies for Writers*, chapter 9.
Young, Becker, Pike, *Rhetoric: Discovery and Change*, pp. 203-27.
Practicum: Analyzing the audience of your report and essay.
Progress report due.

Week Ten: Arrangement
Young, Becker, Pike, *Rhetoric: Discovery and Change*, pp. 273-90.
Paul Anderson, "Organizing Is Not Enough!" in *Courses, Components, and Exercises in Technical Communication*, ed. Dwight Stevenson. (reserve)
Kinneavy, *A Theory of Discourse*, on the arrangement of reference discourse.

Week Eleven: What Constitutes an Effective Technical Writing Style?
Young, Becker, Pike, *Rhetoric: Discovery and Change*, pp. 317-54.
Kinneavy, *A Theory of Discourse*, pp. 166-94.
Merrill Whitburn, "The Plain Style in Scientific and Technical Writing," *Journal of Technical Writing and Communication*, 8 (1978), 349-58. (reserve)
James Stephens, "Style As Therapy in Renaissance Science," in *New Essays*.
Michael Halloran and Annette Bradford, "Figures of Speech in the Rhetoric of Science and Technology," *Classical Rhetoric and Modern Discourse*, in press. (reserve)
Michael Halloran and Merrill Whitburn, "Ciceronean Rhetoric and the Rise of Science," in *The Rhetorical Tradition and Modern Writing*, ed. James Murphy (New York, MLA, 1982), pp. 58-71. (reserve)
Practicum: Stylistic analysis of a report and a scholarly essay.

Week Twelve: What Constitutes an Effective Technical Writing Style?
"Psycholinguistics" and "Readability" (chapters 1 and 4) in *Document Design: A Review of the Relevant Research*, ed. Daniel Felker. (reserve)

Jack Selzer, "What Constitutes a 'Readable' Technical Style?" in New Essays.
Thomas Huckin, "A Cognitive Approach to Readability," in New Essays.
Practicum: Stylistic analysis of the rough draft of your report.

Week Thirteen: Toward a Rhetoric of Visuals
J.C. Mathes and Dwight Stevenson, Designing Technical Reports, chapter 9.
Deborah Andrews, "Visual Presentation of Technical Information," English in Texas, Summer, 1980, pp. 89-91. (reserve)
"Typography" in Document Design: A Review of Relevant Research, ed. Daniel Felker. (reserve)
Michael Macdonald-Ross, "Graphics in Text," in Review of Research in Education, Volume 5, ed. L. Shulman (Itaska, IL: F.E. Peacock, 1978). (reserve)
Report due.

Week Fourteen: Evaluating Technical Documents
Lecture: Evaluating technical documents.
Student reports.

Week Fifteen
Student reports.
Article due.
Course evaluation.

Week Sixteen: Conclusion
Student reports.
Final examination (open book).

THE MULTI-OPTION FORMAT IN TEACHING COMMUNICATION THEORY

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The requirement that students of technical communication study "Communication Theory" typically evokes a negative response in them. Surveys I have taken of students' personal learning objectives show invariably that "To learn about communication ideas and information (communication theory)" ranks dead last (if it is even ranked). Other, broader surveys reveal similar responses: for example, Earl McDowell's study shows that graduates of the University of Minnesota program ranked "communication theory/research" sixth out of six "competency areas" they judged "most important".[1]

As academics, we know that such surveys reveal a problem because we recognize that theory provides the foundation for all the practical knowledge students appear most interested in acquiring. Theory attempts to explain the reasons for the "how to" so that an individual has a thoughtful, intellectual basis for what he does in order that what he does is not simply repetitive, non-thinking activity.

A basic question for teachers of technical communication then is "How do I get students to recognize the significance of theory and to relate theory to practice?" In this paper, I will discuss the method I have chosen: the multi-option format. I will attempt to explain the format, to show how I employ it in teaching communication theory, and to present some of the advantages and disadvantages of this format.

I was introduced to the general concept of the multi-option format at a seminar offered by the United States Air Force at Mount Union College, Alliance, Ohio. However, it was not until I read an article by Mildred Steele on "A New Approach to Communication" that I attempted to learn more about it and how it might be applied to teaching communication theory.[2] Essentially, the format offers a range of "options" from which a student may select to arrive at a understanding of the subject. The instructor serves as a resource person, helping guide the student in his choices. For example, in my communication theory course the student has an 'A' project list and a 'B' project list from which to choose.[3] The projects from the first list are considered to be of a moderate level of difficulty, while those from the second are considered to be of a high level of difficulty. Students must complete one project from each list, although alternate projects that are not on either list and that are of at least equal difficulty may be proposed by the student.

The multi-option format is such that it may be the sole basis for the course or that it may provide a partial basis for the course. As I employ the format, the projects account for 70% of the final evaluation in order to allow for the maximum choice by the students. However, certain materials are required of every student for the remaining 30% of the final evaluation: two required activities include a weekly three-item annotated bibliography of "substantive" readings in communication theory and two take-home essay examinations. These activities are required of everyone so that each person may build an information base for the execution of each of his projects, with the bibliographies as the prime example of this. The examinations also serve this function by providing me with feedback on how students understand key concepts that are basic to communication theory so I may better guide them in clarifying ideas and in finding materials.

The philosophy behind the multi-option format is that there are many avenues to the same end. By having the best opportunity for choice, the student can achieve a better level of understanding because his motivation is enhanced.

The way that an instructor perceives communication theory colors the manner in which he employs the multi-option format. My view of theory is a broad one since my course is required of all communication minors. Thus, I attempt to enhance the students' understanding of communication as an art--that is, its rhetorical dimensions--and communication as a science--that is, its social scientific dimensions. Because of this point of view, I cover a range of topics from intrapersonal to mass communication processes. I have found that this broad range of subjects enhances the multi-option format because it greatly expands the potential choices of areas of study. Since the basic premise underlying the multi-option method is the enhancement of individual choices, the greater the range of choices the better the opportunities for the individual.

Still, with so much to choose from, the logistics of such a course format seem unworkable at first. However, I have noted that the course tends to focus itself. This happens because required class readings and readings students undertake for the required bibliographies help them focus their interests as they are exposed to a variety of ideas. In addition, students must submit project proposals that show a thoughtful basis for what they intend to do; these proposals must include clear research hypotheses or research questions, as well as a listing of potential sources for undertaking the project. These proposals also focus their interests. Finally, I complement their readings and proposals through lectures, audiovisual presentations, and reserve materials.

A course "structured" such as this one has a number of advantages and disadvantages. On the one hand, the advantages are gratifying. Primarily, students seem more stimulated. They seem to perceive more personal involvement in the course and the subject matter because they have to make choices about the directions in which they will move to study communication. This generates a great deal more activity on the part of most students. They undertake the readings and projects with an energy that shows their interest and commitment. I often have students stop by my office to use my personal library for information or to talk with me about an article they have read or an idea with which they are taken. Such personal interest and energy leads to some fine projects; projects that are truly insightful or that clarify a concept or method in a concise, interesting way. Finally, I find personal satisfaction in the way students respond: since I have no majors with which to work, having these students work at a similar interest level is stimulating.

On the other hand, there are disadvantages to the multi-option format for teaching communication theory. One is that most students don't know what to do with the freedom of choice: they want to be told what to do. Having a choice is not something they usually have to cope with in University life so it introduces a reasonable amount of initial frustration. This frustration is overcome as students immerse themselves in the course, but another disadvantage is always present: the need for strict management of time. Each time the course is taught it becomes a different course because of the freedom students have in selecting subjects and options. This requires a lot of preparation time in researching materials for lectures, in finding appropriate audiovisual materials, and in consulting with students about coordinating their projects with the subject matter of the course. It needs to be clear to students when their project will be a part of the course so I must work with them as individuals to make sure that their time is well-managed.[4]

In this paper I have attempted to explain the multi-option format for teaching communication theory, to show how I employ it, and to discuss some of its advantages and disadvantages. While it is a method that is not suited for all courses and that has some intricacy in preparing and using it, it is a method that can add dynamism to the classroom by enhancing student involvement in the thoughtful, intellectual pursuit of knowledge. For communication theory, I have found that it helps students focus their energy on the "why" that is at the root of the "how" that they spend most of their time studying.

NOTES

[1] Dr. Earl McDowell, "Summary Results from McDowell Survey, Ranking of Competency Areas," xerox copy from Dr. John Muller, Air Force Institute of Technology, n.p., n.d.

[2] Mildred Steele, "A New Approach to Communication," *Change Report on Teaching:* *2*, No. 6, Vol. 8 (July 1976), pp. 44-45.

[3] The list of 'A' projects includes:

1. A Communication Journal
2. A Guest Speaker, a Film, a Videotape
3. Two Substantive Reading Reports
4. A Communication Exercise

The list of 'B' projects includes:

1. An Original Videotape
2. An Original Slide Program
3. An Original Audiovisual Program
4. A Research Paper
5. A Creative Paper
6. A Critical Paper

To preserve space I have not included the complete descriptions of all the projects. However, if you will write to me I will send you the complete course syllabus, which includes these descriptions.

[4] This requires a very precise calendar of due dates. This cuts into student freedom, but it makes them responsible for meeting deadlines for something in which they are personally involved and for which they are personally responsible.

FIELD-PARADIGMS: THE RELATION BETWEEN THE TECHNICAL COMMUNICATOR AND THE TECHNICAL TEAM

Richard Watson
Assoc.Professor of Communications
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Chapman College

> "I would suggest that we now find ourselves in a moment precisely analogous to that occupied by Bacon and Descartes, Galileo, Milton, and Hobbes."
> p.385, Timothy J. Reiss, The Discourse of Modernism (Ithaca: Cornell U. Press, 1982)

The work-station for the technical writer is going through a transformation which may very well affect technical writers and their relation to the rest of the technical team. The new interactive text-editing systems, which pull together word-processing, graphics, statistical analysis, documentation, etc. no doubt (where used) will raise the status of the technical communicator. For those of us who train technical writers, this kind of 'upgrading' is an exciting challenge. Teachers will find themselves teaching in a classroom filled with computer terminals, showing students a range of new skills that they will need. This will necessitate curricular changes. But there is a deeper question I think we should ask.

My basic argument is that you cannot write in a specific technical field, at least not with proficiency, unless you have learnt the basic ways of thinking within that field. These ways of thinking I call 'field-paradigms' (after T.Kuhn's well-known formulation).[1] Professionals within a technical field such as electronics or chemistry learn these ways of thinking rather 'intuitively', usually by first taking introductory courses and then more advanced courses in the area. One of the problems for technical writers, as professional communicators, is that they are often good writers (notably English majors) who are thrown into the confusing Babel of specialist tongues and are asked to survive. It would be valuable to develop a curriculum which would help to train these writers in the use of field-paradigms in general, and more specifically in some of the particular field-paradigms they may end up using.

Ramifications: The feeling of many of us is that a redefinition of the role of the technical writer is (at least conceivably) in the offing. Instead of being the 'low man on the totem pole' of a technical team, the technical communicator has the capacity of becoming the coordinator (perhaps even the director) of a team of specialists. This redefinition of role won't occur automatically, but only if the technical communicator begins to assume enlarged responsibilities within the context of the technical team. Indeed, because it won't occur automatically, I think there is room for scepticism whether such a redefinition will actually occur at all-- it certainly won't be easy to accomplish such a redefinition. But it is possible and, given the structure of the technical team, there are practical reasons and needs for such a redefinition. The primary inhibiting factor, which prevents such a transformation of role, is very likely the fact that technical writers have the reputation of being 'semi-illiterate' in the technical fields that they are communicating in. This reputation isn't necessarily ill-deserved: much too frequently, they aren't proficient in the field-paradigms that they are supposed to be using.

In this paper, I would like to suggest some of the problems we will have to face in training a technical communicator that fulfills a new kind of role in the technical team.

2) The Status Problem of the Technical Writer

> A paradigm is what the members of a scientific community, and they alone, share. Conversely, it is their possession of a common paradigm that constitutes a scientific community of a group of otherwise disparate men.
>
> Thomas S. Kuhn, The Essential Tension: Selected Studies in Scientific Tradition and Change (Chicago: University of Chicago Press, 1977), p.294.

The problem for technical writers is that, in most cases, they undergo a non-standard initiation into the field paradigm, which Kuhn also calls the "disciplinary matrix", and that this initiation is often inadequate-- so that they never really become a member of the scientific community, specifically the team, at least not in any very functional sense.

As one engineer noted to us: "In my experience, the technical writer was (more often than not) the cause of screw-ups." This engineer happened to be quite sympathetic to the plight of the poor technical writer. But, in his own experience as a research-team director at Rockwell, and then as one of the many vice-presidents of Xerox, he felt that a real problem exists that we teachers of technical writing must address. We have interviewed a number of such research-team associates, and there seems to be a fairly strong consensus on this point. The technical writer's status, in research teams, development teams, and manufacturing/production teams, is rather low. Only at the end of the line, in the PR team dealing with marketing the product, do the writers come into their own.

There is of course an obvious reason for this problem in status: scientists and engineers tend to be extraordinarily elitist. As Michael John Halliwell points out, "Scientists tend to devalue areas that are considered 'stale'."[2] And technical writing is one of those areas that is considered 'stale'.

What lies behind this question of status is probably the problem of power (or what the sociologists like to call "control rights") within the team. There are various such control rights. One recent study in the structure of research teams suggests the following:

(a)rights to set team goals;
(b)rights to assign tasks;
(c)rights to determine resource allocations;
(d)rights to control or determine channels of communication;
(e)rights to evaluate the output of individual team members;
and
(f)rights to participate in group decision-making processes.[3]

Obviously, technical writers work within the "channels of communication" and, even there, may be restricted in the amount of control they are allowed.

Is there any way we can deal with this problem of low status among technical writers? Well, there is an exception to this image, that may give us clues about what to do. Some of the technical team members we interviewed pointed out that there sometimes emerged a technical writer who was unusually proficient, and who was even sometimes capable of coordinating.the technical team. Such an individual, more often than not, is what is sometimes called a "cross-over". We find individuals, for example, who start their higher-education taking science courses, and have talent in science, but who get interested in literature, and end up being English majors. Cross-overs can occur in the opposite direction, but this is perhaps rarer. A technical writer who is a cross-over is, almost by definition, capable of handling both aspects of technical writing-- the writing, and the technical thinking involved.

The fact that a cross-over has developed competence in both sides we call the "cross-over effect".

3) Instituting the Cross-Over Effect

Structurally, what lies behind the concept of the cross-over is the fact that our educational system, as an Ivory Tower of Babel, is split into two fundamental sides-- the sciences and the humanities. Historically, the latest phase of this split can be seen emerging in the late medieval period in Europe, when we find an educational "battle of the books" between humanists and latter-day 'revisionist' scholastics. As Walter Ong has so ably noted, such revisionists as Ramus and, later, Francis Bacon, were developing a highly diagramatic, visual, 'systems' approach to knowledge which eventually led to the sciences-- the methods for creating new technology. The humanists, on the other hand, were concerned with the effects of technology on humanity and on culture, and more particularly with the counterveiling rhetorical effects that the arts were capable of producing. Out of this split of sensibility emerged, finally, the university with its Divisions of Arts (or Humanities) and of Sciences.

Intuitively we have always tried to bridge this split in the educational system, by creating new Divisions in Babel: the Division of Social Science, and the Division of Education, etc. But, so deep is this split in sensibility that it is very hard to create an educational system to train individuals adequately in both sides, to deliberately create a cross-over effect.

I suspect that, in our training of technical writers, we have to deal with the dynamic of the cross-over effect.

The way it has usually occurred up to now, such a "cross-over effect" has been more accidental than deliberate. In fact, in changing over from the sciences to the humanities, or vice versa, the student frequently suffers an 'existential' crisis of sorts. But out of this frequently emerges a sense of vocation, a calling. It is this sense that technical writers need to develop-- a sense of mission. As teachers in this area, we probably already have at least a touch of this sense of mission. We know something is happening in this field that is exciting.

One mission immediately opens itself up to the technical writer who has experienced the cross-over effect: such a person is able to articulate at least one technical paradigm with a fair amount of expertise and, as a professional communicator, is probably quite sensitive to the communication problems of the team. Such attributes prepare the technical communicator to take what is called the "bridge role", especially in an interdisciplinary team. [4]

Can the technical writer be trained to assume such a role?

Of course, the answer is yes. But, we must remember, particularly those of us who are training English majors-- the competition is tough! First of all, the humanist is on the 'enemy's' turf. Scientists and engineers are not dummies; many of them have formidable intellects, and it is they who assume that they dominate the destiny of the team. Often some especially brilliant young scientist will be given the leadership of team, even though his 'interpersonal' skills might be lacking. How can a technical communicator compete with such a person?

First of all, the command of the language allows the trained technical communicator a way of 'accessing' new field-paradigms all the time. After all, such an individual has been trained in reading (and decoding) Spenser, Shakespeare and Donne and Bacon and Blake, all pretty technical. James Joyce is technical writing. True, the technical writing in Ulysses is from an earlier urban era-- but the training in decoding in that novel and, perhaps even more notably, in Finnegans Wake, prepares the novice technical communicator to handle just about any level of difficulty in technical writing.

Secondly, there are new needs for commmunication within the corporation which the technical communicator is much more qualified to handle than is the scientist-specialist.

4) New Channels for the Technical Communicator

One channel of communication that is opening up in many corporations is what is called 'in-house video', where the corporation uses videotape for various purposes-- e.g. presentation of technical information to salespeople, presentation of manufacturing techniques to workers, presentation of information to the whole corporate population, etc. In moving towards videotape and, indeed, interactive videodisk presentations, we no longer have a technical writer-- Instead what emerges is another aspect of the larger role of technical communicator. And this new role has a much higher status.

Obviously there is a price to pay for such status. One has to learn new disciplines, and new tools of the trade. This is not just a matter of hardware and pushbuttons. Presenting material in the 'documentary' form of video demands new approaches to technical information, such as all the kinetic 'montage' techniques developed for film, video, and slide-tape, as well as interactive programming techniques for random-access (computer-linked) videodisk. Such kinetic presentations are very different from technical writing on the old, static page.

But one thing remains the same. The technical communicator still has to obtain information from the technical people in the corporation by using the fundamental skills of Socratic questioning.

The crucial question then arises-- how will working with these new channels of communication (video, computer-workstations, videodisk, etc) affect relations with the other people in the corporation, particularly those in the immediate work-team?

Perhaps there are two ways to go here-- (1)some technical communicators will specialize in the new, rather intricate channels of communication; (2)other technical communicators will assume greater responsibilities in coordinating team-information, what we have called the bridge-role on the team. Of course, it would be possible for a technical communicator to fill both roles, but perhaps we shouldn't expect too much!

5) The Technical Writer within the Technical Team: A New Job Description

> "we have little knowledge of how research teams operate and of the factors that affect the performance and productivity of research team as teams."
>
> Bernard P. Cohen, Ronald J. Kruse, Michael Anbar, "The Social Structure of Scientific Research Teams," Pacific Sociological Review ,vol.25, no.2, p.206.

Cohen's assessment, made in 1982, is still basically correct, and partly for that reason much inefficiency results in many working teams. There is growing evidence that scientists, particularly young talented scientists, do not always make the best team-coordinators, and yet it is these very people who are given this awesome responsibility. One ancient defense-industry insider, after 37-years of observing bright young engineers being made team leaders, presents the following description of what happens when inexperienced managers are allowed to lead production-teams:

> Almost without exception, the leaders of new programs are those youngsters who invented the idea and nurtured it through conception, proposal and contract award to be given the prize of program management. Then the fun begins. Still basking in the glow of accolades from a grateful corporation

> and the unabashed worship of his equally naive subordinates, the newly hatched program manager proceeds to make all the classical mistakes committed by every other program manager since the phalanx entered Concept Definition Phase in ancient Greece.
>
> If the program survives, and many do not, and if the first management team survives, and many more of them do not, the new weapon will overspend its money and time budgets making and correcting errors an older wiser team would avoid.[5]

Assuming that there is some truth in this letter, even discounting exaggeration, one can make a case for the technical communicator assuming a coordinating role in the team.

So far several different functions for the technical commmunicator have suggested themselves. We can make a hypothetical job description from these functional suggestions.

Job Description for the Technical Communicator:

The original function is still kept:

A)The technical communicator will assume responsibility for the written communication that comes out of the team. Hence

(1) the technical communicator must have the ability/to write well. However, there is an upgrading of qualifications even here:

(2)the technical communicator is expected to be able to handle word-processing-- and indeed to handle graphics and graphing, statistics, data management systems, etc. and all the other relevant programs to be found at a computer work-station. Furthermore, over and beyond familiarity with daisy-wheel and dot-matrix printers, the communicator will be familiar with other methods of commercial printing and layout.

(3)the technical communicator is expected to handle technical paradigms, and to be particularly familiar with several basic scientific field-paradigms. Curriculum suggestions: a number of introductory courses in the basic sciences, especially physics, electronics, calculus, etc.

This upgrading of the old job description for technical writers is perhaps only the first step. If the new role of technical communicator is to be a substantial and functional one in the technical team, the 'bridge-role' probably needs to be prepared. This would suggest the following:

(B)The technical communicator will assume a coordinating role between the technical team and the rest of the organization (an external bridge-role) and a coordinating role between the individual specialists on the team, helping to formulate a common frame of reference beween specialist paradigms (an internal bridge-role).

So, there are two options, two emphases in bridge-role. In one, the technical commmunicator would use the mechanisms of videotape and computerized, interactive videodisk, to communicate technical information to the rest of the corporation (and beyond). The special training here would be in video, etc. In the second role, the technical communicator would be responsible for written reports, etc. coming out of the team--and, in this capacity, would be trained as a coordinator. Training: Interpersonal Communications, Team Management, etc. Perhaps, as we have noted, these two emphases can be combined, but the result would be a very demanding job.

Obviously a rather specific curriculum follows from this job-description. What I would like to do in the rest of this paper is suggest certain problems that we can expect in both curriculum and in the new role of the technical communicator.

First of all, it is not so easy to learn new paradigm-fields. The technical communicator must become expert at entering paradigms in order to communcate.

Secondly, the bridge-role of the technical communicator is going to lead to quite specific, quite anticipatible problems.

6) Entering the Paradigm: Learning "Interactive" Definitions

"the result is a circularity with at least a few
vicious consequences"
Thomas Kuhn, p.295.

Certain technical fields are universes of discourse ('topocosms') which are singularly difficult to enter into for one particular reason: the terms in the field are defined interactively by other terms within the field. Hence the field of electronics: resistance is defined in terms of current and capacitance, etc. Such interactivity here is defined by mathematical equations, but such is not always the case. In the Freudian field-paradigm, at any one of its stages of formulation by Freud, there is a high degree of interactivity-- the preconscious is defined by censor, ego, etc. and in turn these terms are defined tautologically and reflexively by the others, and out of such a 'definitional circuit' are formed other 'definitional circuits', such as those involving the reaction formation, sublimation, the Oedipal Complex, etc.

It is not always easy to break into these definitional circuits from the outside. For example: If one looks up term A in the technical dictionary, one may find that it is defined in terms of B and C. If one looks up term B, looking for further elucidation, we find that it is defined in terms of A and C. If one looks up term C, it is defined by A and B. Luckily, in any particular field that works this way, there are entry points by which an outsider can enter into the symbolic interactivity of the field.

These entry points are points of contact with other fields of activity. Often these fields are more 'fundamental' in the sense that they anticipate the field in question, in the way that biochemistry anticipates molecular biology. More rarely, but sometimes, these fields may be subsequent to the field in question, in the way that chemistry is subsequent to the very interesting area of alchemy, or that astronomy is subsequent to the field of astrology, or that ICs (integrated circuits) is subsequent to vacuum tube technology. Unless he is a tech-historian, the technical writer is usually not interested in such retrograde analysis of entry points. If a field breaks out of an overly-complex field-paradigm (such as Ptolmaic epicycles) into a simpler model (Keplerian ellipses), it is difficult to go back and reconstruct the earlier pattern.

However, there is one crucial advantage to going back, if we can go far enough. We find 'root-metaphors', as they are sometimes called, which are used in subsequent technological fields. Indeed, as one goes back to basic roots of technology, we find entry points-- actually basic perceptions-- that allow us to think in the later field-paradigm. Much of the usefulness, perhaps, of G. Spenser Brown's Laws of Form , comes from his recognition that these root-metaphors act like defining marks of distinction in the later technological field, and that we can actually use a kind of binary-boolian algebra to show the structure, the laws of form, within a particular field.

7) The Interaction of Field Paradigms: Technical Communication in Babel

> The situation can be summarized by saying that biology stands today as the antidiscipline of the social sciences. By the word "antidiscipline" I wish to emphasize the special adversary relation that often exists when fields of study at adjacent levels of organization first begin to interact. For chemistry there is the antidiscipline of many-body physics; for molecular biology, chemistry; for physiology, molecular biology; and so on upward through the paired levels of increasing specification

and complexity.

p.7, Edward O. Wilson, On Human Nature
(Cambridge Ma: Harvard University Press, 1978

If we wish to train the technical communicator to assume a "bridge-role", we will have to formulate the ways the various technical fields interact. One of the reasons we don't know how research teams operate comes from the fact that more than "face-work" is involved. Face-work is Erving Goffman's term for the kinds of interactive bargaining we go through with others, using gestures and looks etc. in order keep face, and keep from losing face, etc. Since everything becomes work in our work-a-day world, it is probably Goffman's ironic equivalent to Freud's "dream-work". When a sociologist observes a research-team, he can observe the interactions involving face and body-language and status-- but that clearly is not enough, even though it is important. There is something more.

The crucial "work" of the team involves communicating between various disciplinary matrices in order to construct a common frame of reference. The common frame of reference is never completely shared, since the specialized languages of the various disciplines are probably too intractable to allow such complete sharing-- but the team involves itself in such "construct-work" as best it can. Working with constructs, then, is the focus of the team's work-- at least officially.

A technical communicator, in assuming a bridge-role, must work in terms of the dual areas of construct-work and face-work, formulating cognitive bridges and social bridges between the members of the team.

This won't be such an easy thing to do. There are many barriers to good communication, which get in the way of such bridge-building.

One model for interaction between the disciplines is a hierarchic one, where the various specialties imitate the Great Chain of Being, starting with the world of lower things, moving up through plants and animals, moving to man, (and even going up above-- e.g. the concept of Angels). E.O.Wilson suggests such a hierarchy of subjects that corresponds to the old Chain of Being, starting with basic material sciences such as physics, then chemistry, biology, and then moving up into the social sciences, etc. He suggests that some kind of closure of subject occurs by dealing with the discipline below (the antidiscipline) and the discipline above:

> It is easy to see why each scientific discipline is also an antidiscipline. An adversary relationship is probable because the devotees of the two adjacent organizational levels-- such as atoms versus molecules-- are initially committed to their own methods and ideas when they focus on the upper level (in this case, molecules). By today's standards a broad scientist can be defined as one who is a student of three subjects: his discipline (chemistry in the example cited), the lower antidiscipline (physics), and the subject to which his specialty stands as antidiscipline (the chemical aspects of biology). [6]

Such a well-rounded scientist naturally can assume a bridge-role in a research team-- and will often be the one chosen to assume such a role. The technical communicator would not be able to compete with such competence, at least not normally-- but such broad-based scientists are not as many as are needed. Given the more normal specialists, the technical communicator may find that the bridge role is quite a feasible one.

8) The Technical Communicator & the Structure of the Technical Team

> The high consensus found in high-paradigm fields enhances predictability in at least two ways: (1)it provides an accepted and shared vocabulary for discussing the content of the field; and (2)it provides an accumulation of detailed information (scientific findings) on what has been successful in the past.
>
> p.61, Janice Beyer Lodahl & Gerald Gorden, "The Structure of Scientific Fields and the Functioning of University Graduate Departments," American Sociological Review vol.37 (1972).

The technical team coordinates its members partly by coordinating paradigms, and the nature of the paradigms shapes much of the interactive behavior of the members. Lodahl and Gorden suggest that some fields are highly developed in their scientific paradigms-- 'high paradigm fields' such as physics and chemistry; whereas other fields are less developed-- 'low paradigm fields' such as are found in the social sciences and, perhaps even more so, in the humanities. High paradigms fields tend to have greater consensus, and tend to foster team-cooperation. One result: "High-paradigm scientists will use more teaching assistants than low-paradigm scientists."(p.63, Lodahl) This leads to a hierarchic structure in high-paradigm teams working within one speciality. On the other hand, low-paradigm teams, such as are found in the social sciences, are "likely to expend more effort in reaching agreement over many decisions, and if this process becomes too difficult, collaboration may no longer offer advantages to scientists." (pp.63-4, Lodahl) Hence there is more conflict in low paradigm teams (p.62, Lodahl).

This might suggest that the technical communicator, trained in low paradigm fields at first, would be at a disadvantage. However, particularly in a multi-disciplinary technical team, such a disadvantage may be turned to an advantage. First of all, even high paradigm fields go through crises-- such as the area of physics right now, so the consensus of a high paradigm isn't guaranteed. Secondly, any time a technical team goes multidisciplinary, the high paradigm of any one discipline no longer can be relied on to create consensus. And the scientist who is trained in a high paradigm field does not have any resulting ability to coordinate between paradigms. In fact, in such a situation, the low paradigm scientist and particularly the technical communicator, might be better prepared to coordinate.

9) The 'Ontology' of the Technical Communicator

> "Thus a science of language must recover the natural -- that is, the simple and original-- relationships between speech and writing, that is, between an inside and an outside."
> p.35, Jacques Derrida, Of Grammatology .Trans.by Gayatri Chakravorty Spivak. Baltimore: John Hopkins Press, 1976 [1967]

What I have attempted here is a practical analysis of the problems of role-transformation facing the technical writer. However, beyond such pragmatic considerations, such a redefinition of role, and indeed of job-description, obviously must involve a philosophy. Since the reformulation of role, if it is to happen, will move many individuals towards a new consensus, it is important to set up ground-rules. We are experiencing a new epistemology, the de-construction of an old structure and sense of reality, and hopefully the re-construction of a new reality.

I would like to address the issue of ontology in a separate paper, and only make the point here that there is an issue of ontology to be addressed. Heidegger, of course, renounces ontology in his Introduction to Metaphysics in rather convincing terms, as Derrida reminds us. Derrida proceeds to replace ontology as a fundamental pursuit with what he calls grammatology, interjecting writing between being (ontos) and logos . This destruction of ontology is useful, since it allows us to resuscitate the term in a new way, with a 'differance'.

And the ontological issue is complicated-- One has to approach what the technical writer does as an interaction between levels, all part of the praxis of the technical team and organization.

Firstly, among the members of the team, there a dynamic relation between the structural concept of the field paradigm of each of the fields, and the structure of the product that is being developed. A technology, in essence, is perhaps the productive relationship between field paradigms and products.

Secondly, the organization works in terms of the duality of face-work and construct-work, the latter being the end and the former the means when things are going well.

Thirdly, technical writing and kinetic communication provide fixed reference points for the work process.

One thing is clear: a new kind of communicator is involved, one that bridges the gap between humanities and sciences, and the gap between specialities within these areas. Such a reformulation requires a total-field approach, a totalistic endeavour that pulls together all fields into a common universe of discourse. As Heidegger has suggested, the pre-Socratics had such a Pythagorian vision, and now this vision is reemerging. Philosophy since the pre-Socratics, he states, is divided--between the sophists and the dialecticians; between the humanists and the scientists, etc.

We can be expected to 'trigger' a number of philosophical moments: the cross-over effect involves an 'existential' crisis; the paradigm involves structuralist assumptions, the use of technology suggests cybernetics, the sense of generalization suggests a systems-analysis approach. Finally, however, I think we must realize that a new total-field philosophy may be emerging here, one whose contours are as yet unclear, but whose contours yet seem to be leading us towards a new consolidation.

FOOTNOTES

[1] I wish to thank John Yules, professor of Physics at Chapman College, with whom I spent many fruitful hours talking about Thomas Kuhn's concept of paradigms in science.

[2] Michael John Halliwell, "Prestige Allocation in Astronomical Research: A Study in Dysfunctional Aspects," *Pacific Sociological Review* vol.25, no.2 (April 1982), p.235.

[3] Bernard P. Cohen, Ronald J. Kruse, Michael Anbar, "The Social Structure of Scientific Research Teams," *Pacific Sociological Review* vol.25, no.2 (April 1982), p.208.

[4] Cohen, *et al* , p.213.

[5] Louis M. St.Martin, "Expansionism in Defense Industry," letter to the *Los Angeles Times* (Wed, Feb.15, 1984), #2, p.12.

[6] Edward O. Wilson, *On Human Nature* (Cambridge, Mass.: Harvard University Press, 1978), p.8.

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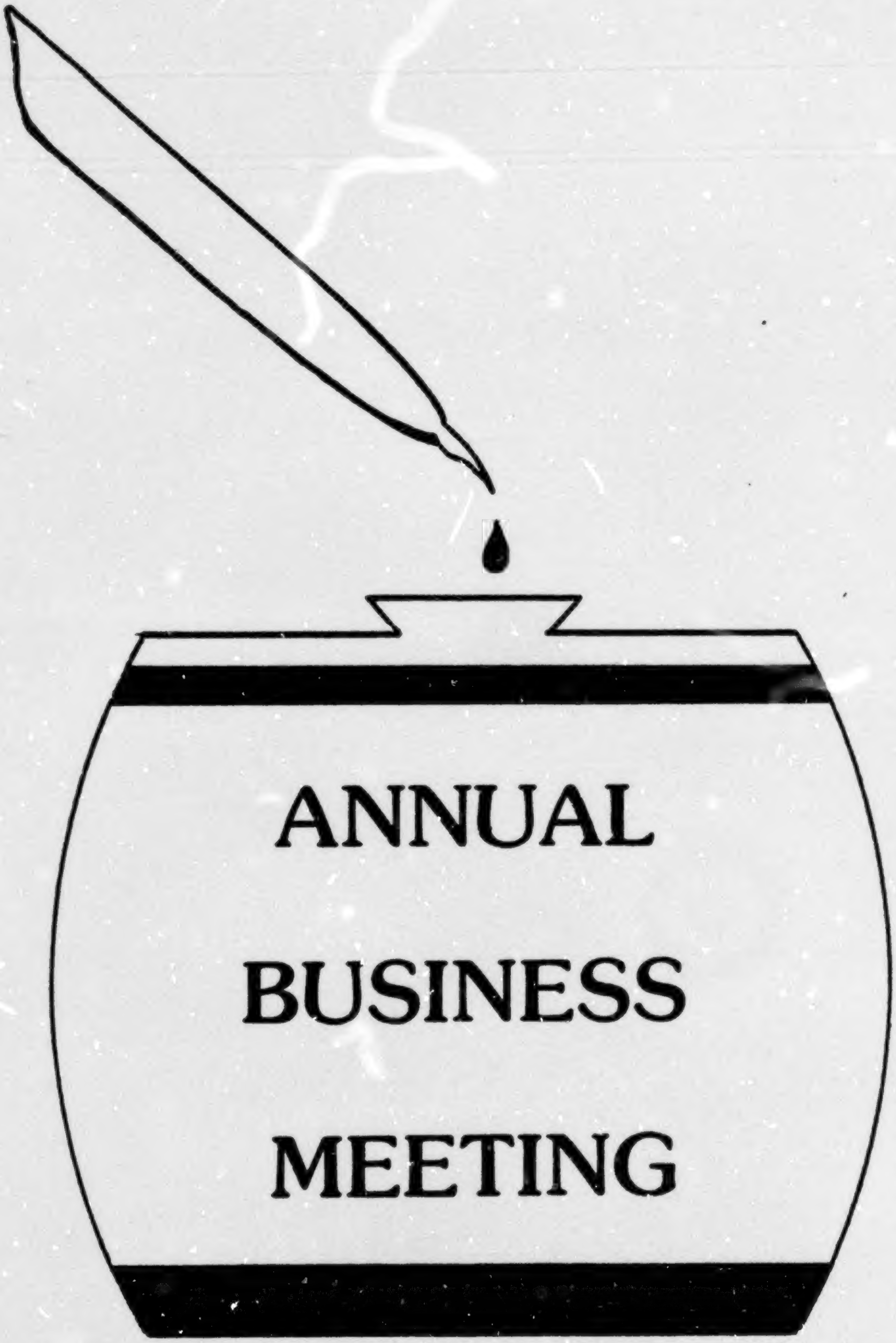

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SECRETARY'S MINUTES FOR 1984

The Annual Business Meeting of the Council for Programs in Technical and Scientific Communication was held at La Fonda in Santa Fe, New Mexico, on February 24, 1984, beginning at 9:20 a.m., with President Virginia A. Book presiding.

Old Business

Members chose to dispense with reading the minutes for 1983, which were accepted and approved unanimously.

Marilyn Schauer Samuels, Treasurer, presented the treasurer's report. The balance in the treasury as of February 15, 1984, was $1,297.26.

Thomas E. Pearsall, Archivist, reported that copies of the Proceedings published by the Council from its founding in 1974 to date are available now in the Archives. except for the year 1976 when a Proceedings was not published. He further reported that he will ask ERIC to include the Proceedings on microform in its system so that they will be accessible outside the Archives.

Patrick M. Kelley, Vice President and Editor, reported that work on the updated directory of programs would begin in earnest during the summer.

President Book moved that the Council thank Kelley and his friends from New Mexico for hosting the meeting in Santa Fe. The motion was seconded and approved unanimously.

Book noted the increasing visibility of the Council through its liaison with other professional associations, presentation of sessions at other national meetings, and consultation on programs by individual members. She also directed attention to the new logo, the membership brochure, the attractive Proceedings, and the forthcoming directory. She expressed concern that the quality of programs in technical and scientific communication be maintained, urging members to continue to share information with new members and to be available for evaluation of new programs.

New Business

The date of the 12th Annual Meeting of the Council in 1985 was discussed. Paul V. Anderson, who will host the meeting at Miami University in Oxford, Ohio, had suggested to Book the dates of February 14-15. After a discussion that centered on concern about the weather in Ohio in February, a motion to ask Anderson to reconsider the early date was passed.

Book presented two offers for the site of the meeting in 1986: Rochester Institute of Technology in Rochester, New York, from Andrea C. Walter, and Clark Community College in Vancouver, Washington, from Robert E. Ryan. After discussion of the two sites, the membership voted to accept the offer of Clark College as the site for the meeting in 1986 and the offer of Rochester Institute of Technology as the site for the meeting in 1987.

Book then presented a slate of officers for 1984-86, as nominated by the Executive Committee:

President	Patrick M. Kelley
Vice President	Paul V. Anderson and Marilyn S. Samuels
Secretary	Carol Lipson and Andrea C. Walter
Treasurer	Sam C. Geonetta and JoAnn T. Hackos
Member-at-Large	William O. Coggin and Mary B. Coney

Each position was voted on individually. After the election of the Treasurer, Jack Selzer nominated JoAnn T. Hackos and Mary M. Lay nominated Carol Lipson for Member-at-Large. Both Hackos and Lipson accepted the nominations. Thomas L. Warren moved that the nominations be closed, Pearsall seconded the motion, and it passed.

The following officers were elected by secret ballot:

President	Patrick M. Kelley
Vice President	Marilyn Schauer Samuels
Secretary	Andrea Corcoran Walter
Treasurer	Sam C. Geonetta
Member-at-Large	JoAnn T. Hackos

Book thanked the tellers, Irene D. Hays and Sherry Burgus Little; all of the members who agreed to have their names included on the slate of nominees; and the outgoing officers for their work throughout their two-year terms on the Executive Committee.

After a motion to adjourn was passed, the meeting ended at 10:22 a.m.

Respectfully submitted,

JoAnn T. Hackos

JoAnn T. Hackos
Secretary

TREASURER'S REPORT FOR 1983-84

This report on the treasury of the Council for Programs in Technical and Scientific Communication was current as of February 15, 1984.

Credits

Balance brought forward (April 30, 1983)	$1,506.45
Memberships: 9 renewals + 15 new = 24 x $15.00	360.00
Sales of past *Proceedings*, etc.	102.50
Interest (May-December 1983)	56.50
	2,025.45

Debits

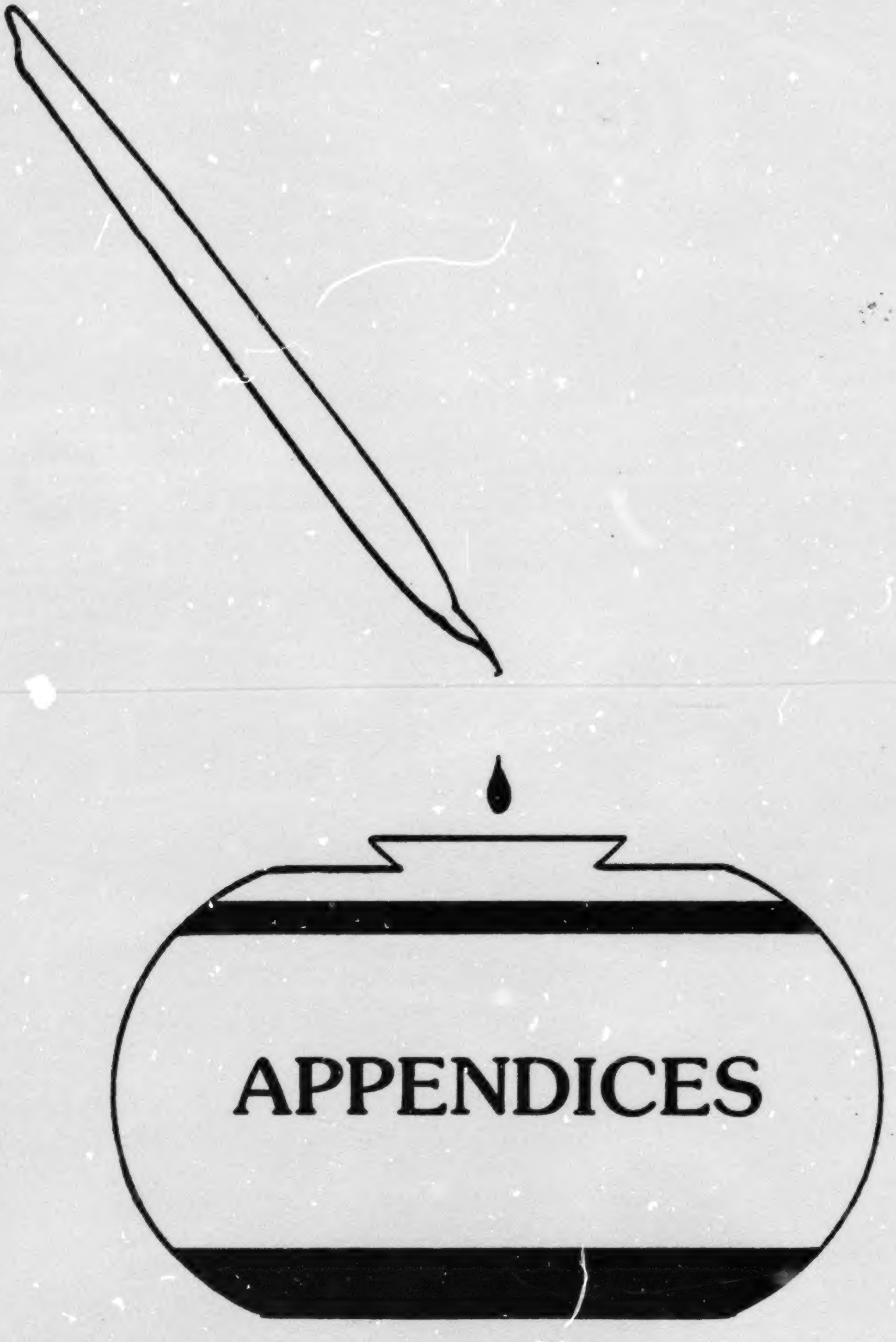
Artwork for membership brochure and *Proceedings 1983*	52.50
Printing, binding, and distributing *Proceedings 1983*	500.33
Communication (stationery, postage, telephone, etc.)	175.36
	728.19

Balance	$1,297.26

Respectfully submitted,

Marilyn Schauer Samuels

Marilyn Schauer Samuels
Treasurer



APPENDICES

APPENDIX A: CONSTITUTION

(As Amended 1981)

ARTICLE I, NAME

The name of the organization shall be the Council for Programs in Technical and Scientific Communication.

ARTICLE II, PURPOSE

The primary purposes of the organization shall be to (1) promote programs in technical and scientific communication, (2) promote research in technical and scientific communication, (3) develop opportunities for the exchange of ideas and information concerning programs, research, and career opportunities, (4) assist in the development of new programs in technical and scientific communication, and (5) promote exchange of information between this organization and interested parties. Said organization is organized exclusively for educational purposes.

ARTICLE III, MEMBERSHIP

Membership shall be open to any individual or institution interested in supporting the purposes identified in Article II. Individuals or institutions whose primary responsibilities or functions are education shall be designated Regular Voting Members. Others shall be designated Special Non-Voting Members. Membership shall be open to any person without regard for race, age, sex, or religious affiliation.

ARTICLE IV, OFFICERS

The officers of the organization shall be president, vice president, secretary, and treasurer, each to be elected for a two-year term.

The duties of the officers shall be:

President:
- (1) preside at the annual national convention of the organization.
- (2) represent the organization at official functions.
- (3) serve as chairman of the executive committee.

Vice President:
- (1) perform all the duties of the president in the event of the president's absence..

Secretary:	(1)	maintain all records of the organization including matters of correspondence.
Treasurer:	(1)	handle all financial matters of the organization including the receiving and recording of dues and payments and paying the bills of the organization.
	(2)	maintain an up-to-date membership list.

The president, vice president, secretary, and treasurer, plus the immediate past president and one member-at-large, elected by the membership, shall serve as an executive committee. The executive committee shall have the right to act on the behalf of the organization at such times as the organization is not meeting in full assembly except to change the constitution or carry out elections.

ARTICLE V, LIMITS

No part of the net earnings of the organization shall inure to the benefit of, or be distributable to, its members, trustees, officers, or other private persons, except that the organization shall be authorized and empowered to pay reasonable compensation for services rendered and to make payments and distributions in furtherance of the purposes set forth in Article III hereof. No substantial part of the activities of the organization shall be the carrying out of propaganda, or otherwise attempting to influence legislation, and the organization shall not participate in, or intervene in (including the publishing or distribution of statements) any political campaign on behalf of any candidate for public office. Notwithstanding any other provision of these articles, the organization shall not carry on any other activities not permitted to be carried on (a) by a corporation exempt from Federal income tax under section 501 (c) (3) of the Internal Revenue Code of 1954 (or corresponding provision of any future United States Internal Revenue Law) or (b) by a corporation, contributions to which are deductible under section 170 (e) (2) of the Internal Revenue Code of 1954 (or corresponding provision of any future United States Internal Revenue Law).

ARTICLE VI, MEETINGS

The organization shall meet in full convention annually. The location of the annual meeting shall be determined by vote of assembly at the preceding convention. The approximate date of the meeting also shall be established.

Special meetings of the organization may be held at need as determined by the executive committee.

ARTICLE VII, FINANCES

The dues for the organization shall be $15.00 per year for Regular Voting Members and $50.00 for Special Non-Voting Members. All dues are payable prior to or upon registration at the annual meeting.

ARTICLE VIII, ELECTIONS

The election of officers and members-at-large to the executive committee shall be held at the annual meeting. The existing executive committee shall each year nominate a slate of officers and a member-at-large and have this slate in the hands of the membership 30 days before the annual meeting. Nominations also will be allowed from the floor at the annual meeting. Elections shall be by written ballot.

ARTICLE IX, CONSTITUTIONAL AMENDMENTS

This constitution shall be amendable by a two-thirds vote of the assembly present and voting at the annual meeting. Proposed amendments to the constitution must be in the hands of the members at least two months in advance of the annual meeting at which the vote is to be taken.

ARTICLE X, DISSOLUTION

Upon the dissolution of the organization, the Board of Directors shall, after paying or making provision for the payment of all of the liabilities of the organization, dispose of all of the assets of the organization exclusively for the purposes of the organization in such manner, or to such organization or organizations organized and operated exclusively for charitable, educational, religious, or scientific purposes as shall at the time qualify as an exempt organization or organizations under section 501 (c) (3) of the Internal Revenue Code of 1954 (or the corresponding provision of any future United States Internal Revenue Law), as the Board of Directors shall determine. Any such assets not so disposed of shall be disposed of by the Court of Common Pleas of the county in which the principal office of the corporation is then located, exclusively for such purposes or to such organization or organizations, as said Court shall determine, which are organized and operated for such purposes.

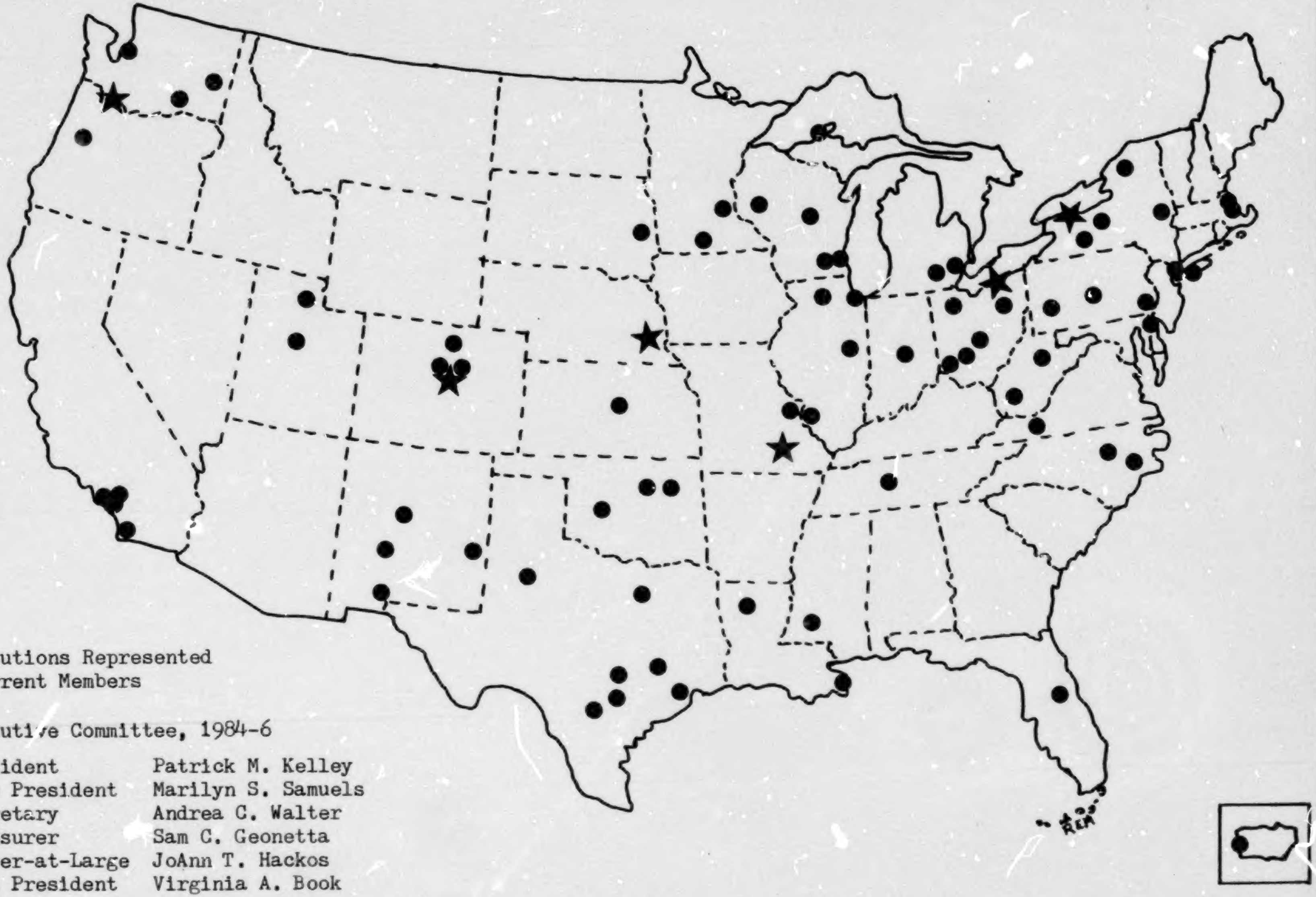
ARTICLE XI,

PARLIAMENTARY AUTHORITY

All official meetings of the organization shall be conducted according to the Standard Code of Parliamentary Procedure by Alice B. Sturgis. The presiding officer shall appoint a parliamentarian to advise the assembly at each annual meeting.

APPENDIX B: ANNUAL MEETINGS, SITES, AND DATES

1st	University of Minnesota	St. Paul, MN	1974
2nd	Boston University	Boston, MA	1975
3rd	Colorado State University	Fort Collins, CO	1976
4th	University of Minnesota	St. Paul, MN	1977
5th	Rensselaer Polytechnic Institute	Troy, NY	1978
6th	Oklahoma State University	Stillwater, OK	1979
7th	University of Central Florida	Orlando, FL	1980
8th	University of Washington	Seattle, WA	1981
9th	Carnegie-Mellon University	Pittsburgh, PA	1982
10th	University of Nebraska	Lincoln, NE	1983
11th		Santa Fe, NM	1984
12th	Miami University	Oxford, OH	1985
13th	Clark Community College	Portland, OR/ Vancouver, WA	1986
14th	Rochester Institute of Technology	Rochester, NY	1987



● Institutions Represented by Current Members

★ Executive Committee, 1984-6

President	Patrick M. Kelley
Vice President	Marilyn S. Samuels
Secretary	Andrea C. Walter
Treasurer	Sam C. Geonetta
Member-at-Large	JoAnn T. Hackos
Past President	Virginia A. Book

APPENDIX C: EXECUTIVE COMMITTEE AND INSTITUTIONS REPRESENTED BY CURRENT MEMBERS

APPENDIX D: MEMBERS IN 1984

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